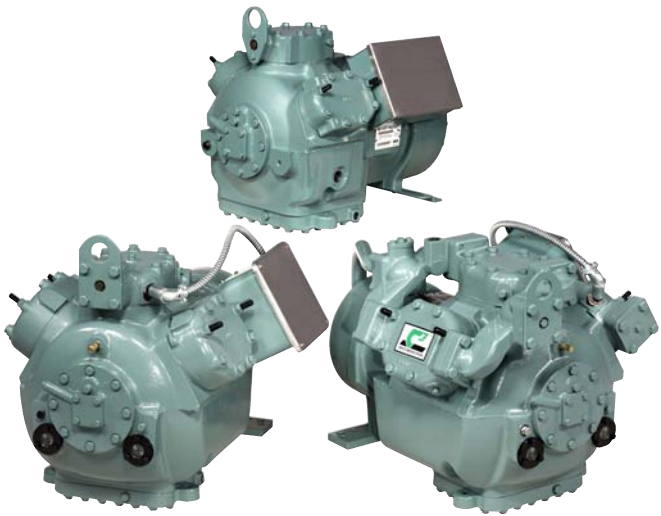
Carlyle™

SERVICE GUIDE



06D/06E/06CC COMPRESSORS

www.carlylecompressor.com

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1.0 — GENERAL COMPRESSOR AND CUSTOMER INFORMATION

1.1 — Compressor Model Number Significance

06D COMPRESSORS

06DR 3 37 0 D A 36 5 A - (RP)**

Model = 0, Package = 1 or 9, A = Shipped Without Oil

Suction Cut-Off Unloading Designation for 06DR, DM Compressors:
0 = All Models Except as Noted
5 = No Oil
7 = 1 Unloader, Suction Cutoff, Oil-less (DR, DM Only)
8 = 2 Unloaders

Electrical Characteristics (XL Start Only, Unless Noted):

High Efficiency Models	Standard Efficiency Models	
31 = 575-3-60	01 = 575-3-60	12 = 208/230-3-60
32 = 208/230-3-60	04 = 200-3-60	13 = 380-3-60
33 = 208/230-1-60	05 = 230-3-60	14 = 200-3-60 (PW)
34 = 220-3-50	06 = 400/460-3-50/60	15 = 230-3-60 (PW)
36 = 400/460-3-50/60	08 = 220-3-50	18 = 220-3-50 (PW)

Electrical Variables:
A = With Internal Thermostat and External Overloads
C = With Internal Thermostat and Without External Overloads

Suction Service Valve – Variables:
Location, Orientation and Mounting Bolts

Compressor Identification Key:
0 = New Compressor
2 = New Compressor
3 = New Compressor
6 = Service Compressor, Remanufactured
7 = Service Compressor, New Manufactured
8 = New Compressor, Special
9 = Service Compressor, Special

Displacement (CFM at 1750 rpm)

Motor Size – (Does Not Signify Horsepower)

Compressor Type:

06DA	= Compressor – A/C Duty	No Unloading
06DB	= Compressor – A/C Duty	1-Step Elec.
06DC	= Compressor – A/C Duty	2-Step Elec.
06DD	= Compressor – A/C Duty	1-Step Press.
06DE	= Compressor – A/C Duty	2-Step Press.
06DF	= Compressor – A/C Duty	1-Step Elec.
06DG	= Compressor – A/C Duty	2-Step Elec.
06DH	= Compressor – A/C Duty	1-Step Press.
06DJ	= Compressor – A/C Duty	2-Step Press.

Hot Gas Bypass Unloading

Suction Cut-Off Unloading

06DM = Compressor Refrig. Duty Medium Temperature
06DR = Compressor Refrig. Duty Low Temperature
06DM = Service Compressor – Replacement for new 06DA, DM without Unloading
06DS = Service Compressor – Replacement for new 06DF,G,H and J with suction cut-off unloading. Compressor has 1-Stage suction cut-off unloading
06DX = Service Compressor – Replacement for new 06DB, C, D, and E with hot gas (bypass) unloading. Compressor has 1-stage of bypass unloading

** Refrigeration Partner

06E COMPRESSORS

06ER 3 99 3 0 A - (RP)**

Model = 0, Package = 1 or 9, A = Shipped Without Oil

Design Variable:

New Compressors:
0 = OEM Model
1 = Carrier A/C Model
2 = Old Design Refrigeration Valve Plates
6 = Carrier A/C Model
8 = OEM with DGT and Oil Charge
9 = Cemak Model

Service Compressors:
2 = New Manufactured (A/C)
4 = Remanufactured (Low Temp.)
6 = Remanufactured (A/C)
7 = Remanufactured (Med Temp.)

Electrical Characteristics (XL and PW Start, Unless Noted):
0 = 208/230-3-60
1 = 575-3-60
3 = 208/230/460-3-50/60 (460v XL Only)
4 = 200-3-60
5 = 230-3-60
6 = 400/460-3-50/60
8 = 230-3-50
9 = 220/380-3-60

Displacement (CFM at 1750 rpm)

Motor Size (Does Not Signify Horsepower)
0,1,2 = Models With Oil
3,4,5 = Models Without Oil
7 = 1 Unloader, Suction Cutoff, Oil-less (ER, EM Only)
8 = Special Order

Compressor Type:

STD*	REV†			
06EA	06EF	Compressor – A/C Duty	No Unloading	
06EB	06EJ	Compressor – A/C Duty	1-Step Elec.	Hot Gas Bypass Unloading
06EC	06EK	Compressor – A/C Duty	2-Step Elec.	
06ED	06EL	Compressor – A/C Duty	1-Step Press.	
06EE	06EN	Compressor – A/C Duty	2-Step Press.	
06E2	06E6	Compressor – A/C Duty	1-Step Elec.	Suction Cut-Off Unloading
06E3	06E7	Compressor – A/C Duty	2-Step Elec.	
06E4	06E8	Compressor – A/C Duty	1-Step Press.	
06E5	06E9	Compressor – A/C Duty	2-Step Press.	
06EM	–	Compressor – Refrig. Duty	Med Temp.	
06ER	–	Compressor – Refrig. Duty	Low Temp.	
06ET	–	Service Compressor A/C Duty. Replaces 06E2,3,4,5, 6,7,8, and 9. Compressor has 1 stage of suction cut-off unloading.		
06EX	–	Serv. Compressor A/C Duty Replaces 06EA,B,C,D,E, F,J,K,L, and N. Compressor has 1 stage of Bypass unloading.		
06EY	–	Service Compressor Refrig. Duty Replaces 06ER		
06EZ	–	Service Compressor Refrig. Duty Replaces 06EM		

* Standard Center Cylinder Head.
† Reversed Center Cylinder Head.

Service compressors shipped with a reverse center head have the letter "R" after the serial number on the shipping box.

** Refrigeration Partner

06CC COMPRESSORS

06CC 6 65 E 201

Design Variable:
101 = Single Pack, W/O Valves, with Oil
102 = Single Pack with Valves & Oil
103 = Single Pack, Service W/O Valves, Term. Box or Oil
201 = Single Pack, W/O Valves or Oil
202 = Single Pack with Valves

Electrical Characteristics:
A = 415-3-50, XL and PW
B = 415-3-50, XL
C = 415-3-50, PW
D = 208/230-3-60, XL
E = 208/230/400/460-3-50/60
F = 400/460-3-50/60, XL and PW
G = 400/460-3-50/60, XL
H = 400/460-3-50/60, PW
J = 575-3-60, XL and PW
K = 230-3-60, PW
L = 220-3-50, XL and PW
M = 220-3-50, XL
N = 220-3-50, PW
P = 220/346/380-3-50/60, XL and PW

Displacement (in Cfm at 1750 rpm) (See Note below)

Motor Size:

0 = 14 ft.-lb (5 HP)	5 = 45 ft.-lb (15 HP)
1 = 20 ft.-lb (6.5 HP)	6 = 60 ft.-lb (20 HP)
2 = 24 ft.-lb (7.5 HP)	7 = 75 ft.-lb (25 HP)
3 = 27 ft.-lb (10 HP)	8 = 90 ft.-lb (30 HP)
4 = Not Assigned	

Compressor Type:
06CC = Compound Cooling Model
06CY = Service Compressor
06C8 = Compressor, Special

NOTE: USE OF "Cfm" AS MODEL SIZE DESIGNATION

Carlyle uses the "Cfm" designation in the model number to identify the compressor size. The Cfm values are the sixth and seventh digits of the model number. See example above.

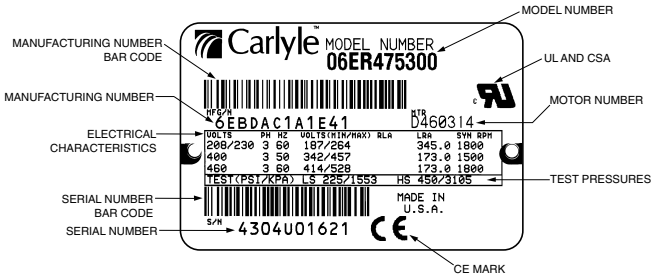
Carlyle offers two series of compressors based on body size. The smaller compressors, from 8 to 41 Cfm, are referred to as "D" size units (model number "06D"). The larger compressors, from 50 to 99 Cfm, are referred to as "E" size units (model number "06E").

The 06CC, or Compound Cooling compressors, are made in 16 to 37 Cfm and 50 to 99 Cfm sizes. The 16 to 37 Cfm compressors use "D" size bodies. The 50 to 99 Cfm compressors use "E" size bodies.

NOTE: METRIC MEASUREMENTS

The compressors are built using English units: inches, foot-pounds, pints, etc. A corresponding metric measurement has been added to all the English units in this guide. These metric measures are a guide only, having been rounded to the nearest whole number, and therefore are not meant to be an exact mathematical conversion.

1.2 — Nameplate Significance



Explanation of the above items, starting clockwise from upper right:

MODEL NUMBER - Used when selecting and ordering a new compressor. Distributors use the model number to obtain a proper service replacement.

NOTE: Model numbers on some compressors are identified by the symbol "M/N" located in the upper right hand corner of the nameplate.

UL AND CSA - Single mark indicates that this compressor meets all the requirements for both UL (Underwriters' Laboratory) and CSA (Canadian Standards Association). All 60 Hz semi-hermetic Carlyle Compressors are UL and CSA recognized and comply with UL, CSA, and NEC (National Electrical Code) requirements for internal motor protection.

MOTOR NUMBER - For Carlyle internal use only.

TEST PRESSURES - Each Carlyle 06D/E/CC compressor is pressure tested at our factory. The “LS” pressures are for the low side of the compressor. The “HS” pressures are for the high side of the compressors.

CE MARK - This CE Mark indicates this compressor complies with the European CE Mark requirements.

SERIAL NUMBER - The unique number given to each compressor. This number, along with the model number and special order number, is normally all that is needed to obtain information about or order a service replacement compressor.

SERIAL NUMBER BAR CODE - For Carlyle internal use only.

ELECTRICAL CHARACTERISTICS - are shown for all semi-hermetic compressors. Voltages are shown with respective operating ranges for both 50 and 60 cycle operation. Electrical phase and LRA (Locked Rotor Amps) information is also provided.

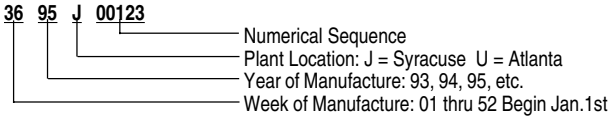
MANUFACTURING NUMBER - For Carlyle internal use only.

MANUFACTURING NUMBER BAR CODE - For Carlyle internal use only.

1.3 — Compressor Serial Number Significance

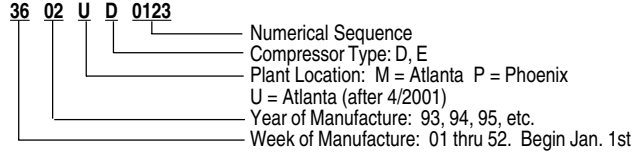
ALL NEW COMPRESSORS

Example: S/N 3695J00123


36 95 J 00123
Numerical Sequence
Plant Location: J = Syracuse U = Atlanta
Year of Manufacture: 93, 94, 95, etc.
Week of Manufacture: 01 thru 52 Begin Jan.1st

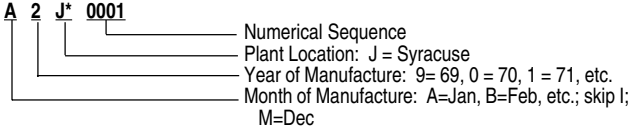
ALL SERVICE COMPRESSORS

Example: S/N 3695UD0123


36 02 U D 0123
Numerical Sequence
Compressor Type: D, E
Plant Location: M = Atlanta P = Phoenix
U = Atlanta (after 4/2001)
Year of Manufacture: 93, 94, 95, etc.
Week of Manufacture: 01 thru 52. Begin Jan. 1st

NEW AND SERVICE REPLACEMENT COMPRESSORS BUILT BETWEEN NOV. 1968 - OCT. 1978

Example: A2J0001


A 2 J* 0001
Numerical Sequence
Plant Location: J = Syracuse
Year of Manufacture: 9= 69, 0 = 70, 1 = 71, etc.
Month of Manufacture: A=Jan, B=Feb, etc.; skip I;
M=Dec

*An "X", "A" or "P" in this location indicates service compressor.

1.4 — Carlyle OEM Compressor Warranty

Original OEM compressors are warranted to be free from defects in material and workmanship for a period of 12 months from the date of original installation, or 20 months from the date of manufacture, whichever comes first.

When a service compressor is used to replace an original compressor, the remaining portion of the first-year OEM warranty is transferred to the service compressor (within the United States and Canada).

Equipment may carry an extended OEM warranty if that warranty has been purchased from the OEM. The OEM issues the extended warranty, not Carlyle or its distributors, and the OEM is responsible for providing the end user with the credit.

If returning a compressor:

- place all parts back into compressor
- seal all compressor openings (oil leakage may create an environmental hazard)

NOTE: Opening a compressor for observation or determination of failure does not void warranty.

1.5 — Service Billing and Credit

Returns of in-warranty parts should be made to the same Local Carlyle Distributor who supplies these replacement parts.

Local Carlyle Distributors will sell parts and service compressors only to credit-approved accounts (except for cash sales).

1.6 — Green Carpet Program, Parts and Stocking Policy

The Carlyle Green Carpet program is a free service created to assist users in obtaining service replacements. The Green Carpet Program supports replacement compressors for reported installations, ensuring availability at the designated distributorship closest to the end-user's location. Green Carpet Customer Service Representatives can provide assistance in locating the necessary distributor 24 hours a day, 365 days a year.

- U.S.A., Puerto Rico - 1 (800) GO-CARLYLE (462-2759)
- Canada - 1 (800) 258-1123
- Mexico - 001 (800) 462-2759

2.0 — START-UP, TROUBLESHOOTING, AND SERVICE

2.1 — Technical Assistance - Carlyle OEM Compressors

Carlyle Compressor Division sells compressors to OEMs (Original Equipment Manufacturers) that design and build the finished system. The OEM is the expert

on the entire system, including the Carlyle compressor. All system or compressor questions should be directed first to the OEM or the OEM's local representative. If questions cannot be answered by the OEM or this Service Guide, please contact the Carlyle engineering group.

The following recommended start-up procedure for Carlyle 06D, 06E, and 06CC compressors will help eliminate initial compressor failures caused by flooded start, floodback, overheating, and running out of oil.

The Troubleshooting Procedures section (Section 2.3, pages 20 to 31) will help pinpoint compressor and system problems.

The Service Procedures section (Section 2.4, pages 32 to 43) covers the replacement of valve plates and gaskets, service to the bearing head assembly containing the oil pump, and a clean-up procedure to follow in case of motor burnout. Most other internal service requires replacement of the compressor.

2.2 — Recommended Start-Up Procedure

Reliability data of Carlyle's 06D, 06E, and 06CC refrigeration compressors indicate that at least half of compressor failures occur during the first two to four months of operation. Many of these failures occur during the initial start-up of the unit. In other cases, troubled start-ups lead to compressor damage severe enough to cause premature failures. The major causes of failures of these compressors are flooded start, floodback, overheating, and running out of oil. Most of these failures can be avoided by using more care during the initial start-up of the compressors. Therefore, the following start-up procedure for 06D, 06E and 06CC compressors is provided.

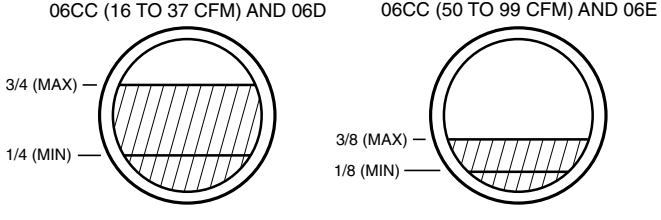
BEFORE START-UP

1. Verify that the compressor nameplate indicates proper model and voltage. Do the values agree with system needs and available power?

2. Verify that there is oil in the system.

   Since different refrigerants (CFC, HCFC, or HFC) require specific oils (mineral, alkylbenzene, or polyolester [POE]), Carlyle ships most new and service compressors without oil. The oil level for 06CC size 16 to 37 Cfm compressors and all 06D compressors should be at 1/4 to 3/4 of the sight glass. The oil level for 06CC size 50 to 99 Cfm compressors and all 06E compressors should be at 1/8 to 3/8 of the sight glass. **See Sections 3.6 and 3.7, pages 69 to 72 for the proper Carlyle approved oils for the selected refrigerant. Oil should be added through the recommended oil fill connection ports on the compressor as identified in the figures in section 2.5.**
   Once the compressor system has been running for at least 24 hours, the most accurate oil levels are observed when the compressor is off. Oil levels in the sight glass can be affected by the rotation of the running gear.

RECOMMENDED OIL LEVELS



⚠ CAUTION

Do not add excess oil. It is especially important on the 06E and 06CC (50 to 99 Cfm) compressors that excess oil not be added to the system. Laboratory tests and field experience indicate excessive oil levels can cause blown valve plate and cylinder head gaskets, increase compressor operating temperatures, and cause oil equalization problems.

NOTE: All 06D compressors and 06CC (16 to 37 Cfm) compressors have one sight glass on the side of the crankcase. All 06E compressors and 06CC (50 to 99 Cfm) compressors have two sight glasses, on the oil pump end of the compressor.

Parallel compressor applications typically use an oil-control float system consisting of individual floats, a separator and an oil reservoir. When using a float system, do not interconnect the floats with an "equalization system" without approval from Carlyle application engineering. The use of a float "equalization system" can result in system oil control problems.

An oil equalization line can be used instead of a float system, except with 06CC compressors. The equalization line and the compressors must be level, and the line diameter must be large enough to allow both the refrigerant and oil to equalize between all the interconnected compressors. If the line is not level, it is undersized or the system contains too much oil, the oil level will rise filling the line, and oil control between compressors will be lost. Typically, equalization lines are 1 1/8 in. (28 mm) in diameter or larger. For 06D compressors, a sight glass in the line is required to determine the system oil level.

Parallel systems using three (3) or more 06E compressors **require** the use of a common motor barrel interconnection line between compressors. Use of an interconnection line is **strongly recommended** on two (2) 06E

compressor unit configurations. This system prevents oil from building up in an 06E motor barrel during the off cycle, thereby preventing an oil slug on start-up. The line is either 1/4 in. (6 mm) or 3/8 in.(8 mm) tubing interconnecting to fittings located in the bottom of the 06E crankcases. To connect to the 06E compressor motor barrel, fitting P/N 5F20-1311 (5/8 in.-18 x 1/4 in. NPT) with AU51YA001 gasket is recommended. Some 50 cfm compressors have a 1/4 in. NPT connection and do not require the 5F20-1311 fitting. The motor barrel interconnection line is in addition to either the crankcase oil equalization line or the oil floats.

Never interconnect the motor barrels of 06CC compressors, as the oil sump of these compressors are at intermediate pressure.

⚠ CAUTION

06E compressors will not tolerate excessive oil charges. Laboratory tests and field experience confirm that excess oil, especially in 06E compressors, can cause cylinder head gaskets and valve plates to fail, increase compressor operating temperatures, and lead to oil control problems. Page 12 notes the correct oil levels.

⚠ CAUTION

Do not charge oil through the suction line or through the compressor suction access fittings. See the compressor figures in Section 2.5 for the location of the recommended oil charging ports. Adding oil into the suction side of the compressor can result in oil intake directly into the cylinders resulting in suction/discharge valve, piston and/or connecting rod damage.

Use only Carlyle approved oil appropriate for the refrigerant being used. Sections 3.6 and 3.7 on pages 69-72 list all the approved oils. Section 3.11 on page 73 notes the correct oil pump pressure in relation to age of the compressor.

3. Leak test, evacuate, and dehydrate the system.

4. Charge the system. When initially charging the high side of the system with liquid refrigerant, all service valves should be closed (front seated). This will prevent refrigerant from migrating to the compressor crankcase and into the oil, causing a flooded start.

   The system is now charged and ready for start-up. Recheck the oil levels and add or remove oil as necessary. Open (backseat) the discharge service valve and any oil equalization lines on parallel systems. Open the suction service valve 1/2 to 1 turn, or enough to allow the compressor to run without tripping the low-pressure switch. This is to prevent damage to the compressor from any liquid refrigerant floodback.

5. On water-cooled condensing systems, open water supply valve and allow water to reach condenser. On air-cooled condensing systems, turn condenser fan on when the compressor unit is started.

6. Ensure that all evaporator connections are opened and fans started.

7. On systems with more than one compressor in parallel, start one compressor at a time.

COMPRESSOR START-UP

1. After circuit breaker and control circuit switches are placed in the ON position and the compressor starts, listen for unusual sounds. If unusual sounds are heard, shut down the compressor, investigate the cause, and correct. Possible problems are:

   • excessive vibration
   • excessive oil
   • liquid slugging
   • low oil

2. After the compressor has run 10 to 15 minutes and no liquid floodback is evident, completely open suction service valve. The other compressors within the system should be started in the same manner.

3. To ensure operating oil levels are within acceptable limits, closely observe the oil level in the compressors until the system has stabilized. During operation all refrigeration systems will lose some compressor oil to the system because:

   • All systems have a film of oil on the inside surface of the piping. At start-up, the lines are dry and the oil which coats the lines comes from the compressor crankcase.

   • Oil also traps in the low refrigerant velocity area of the system and must be made up by adding oil to the system. On systems with hot gas defrost, inspect the compressor for excessive oil after the defrost cycle has been completed.

   The oil lost to the system must be replaced, but take care not to add too much. The 06E and 06CC (50 to 99 Cfm) compressors have been successfully started in supermarket refrigeration configurations by adding only 1 quart

(liter) of additional oil per compressor. The amount to be added will vary depending on the system, but keeping the oil level between 1/8 and 3/8 level in the sight glass will eliminate the chance of excessive oil charges.

⚠ CAUTION

Adding excessive oil to the 06E and 06CC (50 to 99 cfm) compressors can cause blown gasket problems.

When CFC or HCFC refrigerants are used with mineral or alkylbenzene oils, foam in the sight glass normally indicates either that there is serious liquid refrigerant floodback or that the running gear is hitting the oil due to a very high oil level. Very high oil levels are caused by either too much oil or excessive liquid refrigerant in the crankcase. HFC refrigerants and POE oils do not foam easily, so there will be less indication in the sight glass of either liquid refrigerant floodback or too much oil in the system.

⚠ CAUTION

Liquid refrigerant should never be allowed to flood back to the compressor. It may wash out bearings and damage gaskets. If liquid floodback is occurring, adjust the expansion valve or make other adjustments as necessary to eliminate this condition.

NOTE: One possible cause of flooding is improper control of the defrost cycle. Ensure defrost cycles are staggered so no more than one third of the system is on defrost at any time.

COMPRESSOR OPERATING LIMITS

Figures 1A and 1B show the components and typical operating ranges of the Carlyle 06D, E and 06CC compressors.

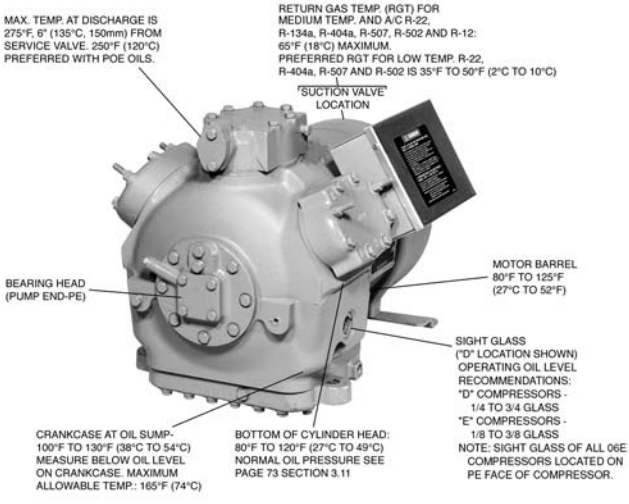


Fig. 1A — Typical 06D, E Operating Limits

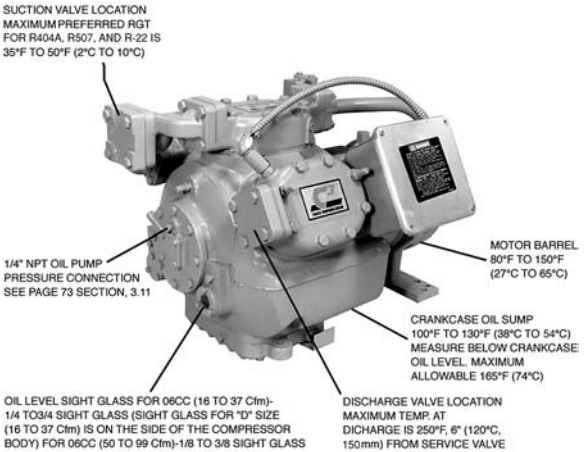

SUCTION VALVE LOCATION
MAXIMUM PREFERRED RGT
FOR R404A, R507, AND R-22 IS
35°F TO 50°F (2°C TO 10°C)
1/4" NPT OIL PUMP
PRESSURE CONNECTION
SEE PAGE 73 SECTION, 3.11
MOTOR BARREL
80°F TO 150°F
(27°C TO 65°C)
CRANKCASE OIL SUMP
100°F TO 130°F (38°C TO 54°C)
MEASURE BELOW CRANKCASE
OIL LEVEL. MAXIMUM
ALLOWABLE 165°F (74°C)
OIL LEVEL SIGHT GLASS FOR 06CC (16 TO 37 Cfm)-
1/4 TO3/4 SIGHT GLASS (SIGHT GLASS FOR "D" SIZE
(16 TO 37 Cfm) IS ON THE SIDE OF THE COMPRESSOR
BODY) FOR 06CC (50 TO 99 Cfm)-1/8 TO 3/8 SIGHT GLASS
DISCHARGE VALVE LOCATION
MAXIMUM TEMP. AT
DICHARGE IS 250°F, 6" (120°C,
150 mm) FROM SERVICE VALVE

Fig. 1B — Typical 06CC Operating Limits

2.3 — Troubleshooting Procedures

⚠ DANGER

Before attempting service work on the compressor, the following safety precautions must be strictly observed. Failure to follow these instructions could result in serious personal injury or death. See Warning Label.

Follow recognized safety practices and wear protective goggles.

Do not operate compressor or provide electric power to this unit unless the compressor terminal box cover is in place and secured.

Do not provide power to unit or turn on compressor unless suction and discharge service valves are open.

Do not remove the compressor terminal box cover until all electrical sources have been disconnected.

⚠ DANGER

When leak-testing semi-hermetic compressors, check around the terminal box **COVER.** Test around the wire entry point(s) of the **COVER** because refrigerant is likely to concentrate there. **Do not remove the terminal cover to perform this leak testing because bodily injury or death can result from fire and/or explosion if cover is removed or unsecured before power is disconnected and pressure is relieved. Electrical terminal pins may blow out, causing injury and fire.**

COMPRESSOR ISOLATION

If you have determined there is no refrigerant leak around the terminals and the compressor must be replaced, proceed beginning with Step 1:

1. Shut off suction and discharge service valves to isolate compressor and slowly remove all refrigerant in compressor. Appropriate service practices should be followed to properly reclaim refrigerant removed from the compressor.

2. Disconnect all electrical wiring to compressor.

3. Unbolt suction and discharge service valves from compressor.

   REMINDER: These valves may be sealing off refrigerant from the rest of the system. Do not open these valves without first determining whether there is refrigerant in the system.

Troubleshooting Guide - 06D,06E and 06CC Compressors

OBSERVATION	POSSIBLE CAUSE	REMEDY
1. Compressor will not start	Power off	Check main switch, fuses and wiring
	Current overload open	Reset manually
	Oil safety switch open	Reset manually
	Loose electrical connections or faulty wiring	Tighten connections. Check wiring and rewire if necessary.
	Compressor motor burned out	Inspect and replace compressor if defective.
2. Low compressor capacity or inability to pull down system	Broken connecting rods or pistons	Replace compressor
	For 06CC only: Blown valve plate or cylinder head gasket	See No. 3
	Leaky valve plates or worn valve seats	Replace valve plate assembly
	Leaky or broken suction valves	Pump down, remove cylinder head, examine valves and valve seats. Replace if necessary.
	Check pressure difference between suction, interstage and discharge if: a. pressure is low between suction and interstage b. pressure is low between interstage and discharge	 a. Check for problems in low stage heads b. Check for problems in high stage head

OBSERVATION	POSSIBLE CAUSE	REMEDY
3. Blown valve plate or cylinder head gaskets	Cylinder head bolts not properly torqued	a. Replace gaskets b. Retorque cylinder head bolts to: 06D and 06CC (16 to 41 Cfm): 30 to 35 ft.-lb (40 to 48 Nm) 06E and 06CC (50 to 99 Cfm): 90 to 100 ft.-lb (122 to 136 Nm)
	Excessive oil in 06E and 06CC (50 to 99 Cfm) compressors causes hydraulic cylinder pressures	a. Remove excessive oil until oil level Maintained between 1/8 to 3/8 up the sight glass b. On multiple 06E compressor units, add motor barrel oil equalization line NOTE: Do not use a motor barrel oil equalization line with 06CC compressors
	Liquid refrigerant floodback or flooded start	See No. 7 (Flooding)
4. Compressor cycles intermittently	Low-pressure switch erratic in operation	a. Check tubing to switch to see if clogged or b. Verify proper setting of switch
	Insufficient refrigerant in system	Add refrigerant
	Suction service valve closed	Open valve
	Insufficient water flowing through condenser or clogged condenser	a. Adjust water regulating valve to condenser b. Clean condenser
	Discharge service valve not fully open	Open valve
	Air in system	Reclaim and recharge
5. Compressor continually cycles	Faulty pressurestats	Repair or replace
	Dirt or restriction in tubing to pressurestat	Check and clean tubing
	Condenser capacity reduced by refrigerant over-charge accompanied by high discharge pressure	Remove excess refrigerant
	Plugged filter-drier	Replace filter

OBSERVATION	POSSIBLE CAUSE	REMEDY
6. Low discharge pressure	Excessive water flow through condenser	Adjust water regulating valve
	Suction service valve partially closed	Open the valve
	Leaky compressor suction valves	Pump down, remove the cylinder head, examine valves and valve seats. Replace if necessary
	Worn piston rings	Replace compresor
7. Flooding	Improper system piping allows liquid to compressor	Correct piping
	Defrost cycle improperly set or not operating correctly	Do not allow more than 1/3 of system on defrost at any time. Verify proper operation of defrost system
	Defective or improperly set expansion valve	Increase superheat or replace valve
	Evaporator fan failure	Correct problem or replace fan
8. Low suction pressure	Insufficient refrigerant in system	Add refrigerant
	Evaporator fan failure	Correct problem or replace fan

OBSERVATION	POSSIBLE CAUSE	REMEDY
9. Compressor noisy	Slugging due to floodback of refrigerant	See No. 7 Flooding
	Hydraulic knock due to excess oil in circulation	a. Remove excess oil b. Recheck oil return system and pipe sizes
	Bearings damaged because of loss of oil	a. Add oil (only after confirming all system oil has returned to the compressor) b. Check oil return system and piping size c. See No. 15 (Parallel Systems Oil Level) and No. 11 (Oil Pressure) d. Check for defective oil failure control
	Improper support or isolation of piping	Provide sufficient right angle bends in piping to absorb vibration and support firmly with suitable hangers
	Compressor not firmly mounted	Check for loose mounts
	Unit not properly isolated or vibration pad defective	Add vibration isolation or check for defective isolation pads
	Broken connecting rods, valves or other running gear	Replace compressor
10. Pipe rattle	Inadequately supported piping or loose pipe connections	a. Support pipes and/or check pipe connections b. Add muffler or baffle plate

OBSERVATION	POSSIBLE CAUSE	REMEDY
11. Oil pressure lower than normal or no oil pressure	Low oil charge	Verify oil level requirements
	Faulty oil pump drive segment	Replace segment
	Refrigerant Floodback	See No. 7 (Flooding)
	Desuperheating TXV stuck open	Replace TXV
	Worn oil pump	Replace bearing head assembly
	Worn compressor bearings	Replace compressor
12. Compressor motor protectors or discharget temperature sensor tripping or cycling	High suction pressure on low temperature compressor causes excessive amp draw	If system does not have EPR valve, throttle suction service valve until system pulls down
	High discharge pressure	Check for loss of condenser water, blocked condenser fan or coil, or defective fan motor
	Incorrect overload relay or must trip amp setting too low	Replace with correct overload relay
	Defective overload relay or circuit breaker	Replace
	High suction temperature	Reduce suction temperature by TXV adjustment or provide desuperheating
	Loose power or control circuit wiring connection	Check all power and control circuit connections
	Defective motor	Check for motor ground or short. Replace compressor if found
	Faulty motor protection device	On all 06E and 06CC compressors, check the thermal sensor in the cylinder head. Replace head sensor if necessary
	High compression ratio (suction too low/condensing too high): return gas temperature above application limits	Adjust compressor operational envelope
	For 06CC compressors only: Broken valve on high stage or blown high stage gasket	Repair compressor
	Insufficient desuperheating	Adjust desuperheating valve

OBSERVATION	POSSIBLE CAUSE	REMEDY
13. Compressor cycles on locked rotor	Low line voltage	Measure line voltage and determine location of voltage drop
	Seized compressor (remove bearing head assembly and attempt to rotate crankshaft)	Replace compressor
	Compressor motor defective	Check for motor winding short or ground
	Single phasing	Measure voltage across all 3 legs at contactor. Correct source of problem
	Liquid refrigerant condensing in cylinder	Check and replace valve plates
	On part-winding start compressors, the second set of windings may not be energized	a. Faulty contactor - replace b. Faulty time-delay relay - replace
14. Motor Burnout	Inspect control box for welded starter contacts, welded overload contacts, or burned out heater elements	Replace defective components and compressor. Check refrigerant and oil for contamination and clean to prevent repeat failure
	Inspect failed compressor for worn bearings or motor compartment contamination	Replace compressor. Check refrigerant and oil for contamination and clean to prevent repeat failure

OBSERVATION	POSSIBLE CAUSE	REMEDY
16. On parallel compressor installations, oil level does not equalize or remain at a constant leve in all compressors	Oil equalization line not level preventing gas equalization NOTE: Oil equalization lines cannot be used with 06CC compressors. A float system must not be used	Level oil equalization line
	06E Compressors Only: Pressure equalization check valve in the motor rotor lock bolt may have been left out in one or all compressors NOTE: check valve not required with float system	Remove suction service valve and look for check valve in motor rotor lock bolt at the end of the crankshaft. Check valve is required on all 06E compressors in parallel systems using the oil equalization line connected at the sight glass location
	Excessive blow-by into crankcase - worn rings, valves or blown gasket	Replace gasket, valve plate, or compressor
	Improper suction line sizing	Resize lines
	Oil reservoir check valve bad or wrong pressure	Replace check valve; 20 psi check valve required
	With Float System: Oil is not equalized in sight glass	a. Check floats. Replace defective floats b. Check for proper selections and settings -All 06D and 16 to 37 Cfm 06CC -1/4 to 3/4 sight glass -06E and 06CC (50 to 99 Cfm) -1/8 to 3/8 sight glass c. If floats have equalization line, the line between the floats may have to be removed. Contact Carlyle engineering

OBSERVATION	POSSIBLE CAUSE	REMEDY
16. Compressor running hot	Blown valve plate or cylinder head gasket	See No. 3 (Blown Valve Plate)
	Broken suction or discharge valve	Replace valves and valve plate if necessary
	Compression ratio too high	a. Verify proper setting of high and low pressure switches b. Inspect for condenser plugging c. Ensure all evaporator and condenser fans are operating properly
	High suction temperature	Reduce suction temperature by TXV adjustment or provide desuperheating
	Cylinder head cooling fan not operating or incorrect voltage for fan motor	Replace defective part or verify available voltage agrees with fan motor voltage
	06E and 06CC (50 to 99 Cfm) Compressors only: Non-seating internal pressure relief valve	Check for signs of overheating, replace if necessary
	High oil level	Lower oil level
	Excessive blow-by into crankcase - worn rings, valves or blown gasket	Replace gasket, valve plate, or compressor

OBSERVATION	POSSIBLE CAUSE	REMEDY
17. Oil safety switch trip	Faulty switch or oil pressure settings NOTE: Never add oil to the system without first confirming that oil has been physically lost, not simply trapped in the system. Check oil levels after a defrost cycle	Manually check for oil pressure. If correct, check that switch is correct model and has proper settings (see page 75, Section 3.14)
a. If sight glass appears empty	Oil trapped in the system NOTE: At times, the sight glass may appear empty when actually it is completely full	a. Check line sizing and risers for proper sizing to return oil b. If floats are being used, check for proper setting and proper functionality
b. If sight glass appears normal	Liquid refrigerant in crankcase	a. Check for low superheats which can return liquid refrigerant - raise superheat b. Check for liquid migration during OFF cycle - provide a form for pumpdown protection

OBSERVATION	POSSIBLE CAUSE	REMEDY
For 06CC Compressors Only:		
18. High midstage pressure	Broken valve or blown gasket on the high stage	Replace broken valves or gasket
19. Low midstage pressure	Broken valve or blown gasket on the low stage	Replace broken valves or gasket
20. Economizer/Desuperheater connection hot	Broken valve on high stage	Replace broken valves
	Blown high stage gasket	Replace gasket
21. Intermediate pressure equals the discharge pressure	Center low stage valve plate gasket is blown (typically caused by heavy liquid floodback or flooded start)	Eliminate floodback and replace gasket
	Compressor started with discharge service valve closed	Open discharge service valve
	High stage valve plate is on the low stage cylinder head	Switch valve plates so high stage valve plate is on the high stage cylinder head
	Internal relief valve loose	Tighten internal relief valve
	Internal relief valve blown	Replace internal relief valve

LEGEND
EPR - Evaporator Pressure Regulator
TXV - Thermostatic Expansion Valve

2.4 — Service Procedures

The service section covers replacement of valve plates and gaskets, service to the bearing head assembly containing the oil pump, and a clean-up procedure to follow in case of motor burn out. Most other internal service requires replacement of the compressor.

REMOVE, INSPECT AND REPLACE CYLINDER HEAD AND VALVE PLATE ASSEMBLY

To test for leaking discharge valves or blown cylinder head or valve plate gaskets:

1. Pump compressor down.

2. Observe suction and discharge pressure equalization. If valves are leaking or a gasket is blown, the pressure will equalize rapidly.

   Maximum allowable discharge pressure drop is 3 psi per minute after initial drop of 10 to 15 psi in first half minute.

   New reed valves may require 24 to 48 hour run-in time to seat completely.

   A compressor bank (head) with a blown gasket can also usually be detected by touch since the head temperature will normally be much hotter than a bank with good gaskets.

3. If there is an indication of loss of capacity, and discharge valves are functioning properly, remove valve plate assembly and inspect suction valves.

NOTE: This test procedure is not applicable to compressors equipped with pressure actuated unloader valves due to rapid pressure equalization rate. Inspect suction and discharge valves by disassembling valve plate.

DISASSEMBLY

1. Disassemble cylinder heads by first loosening cylinder head bolts. Leave at least 2 bolts partially threaded to prevent any problems if refrigerant is accidentally left in the compressor under pressure. To separate the cylinder head from the valve plate, pry up between the head and valve plate. When the cylinder head is separated from the compressor body remove the last threaded bolts.

⚠ CAUTION

Do not hit the cylinder head to break it free of the valve plate. This may shear the valve plate dowel pins. Sheared dowel pins usually require that the compressor be replaced.

2. Inspect cylinder heads for warping, cracks, or damage to gasket surfaces. Replace if necessary.

3. After the cylinder head is off, the valve plate may be removed as follows:

   a. Remove one valve stop cap screw and loosen the other.

   b. Swivel valve stop to allow access to hole from which the cap screw was removed.

   c. Re-insert cap screw and tighten to break valve plate away from compressor. (Jack screw method, see Fig. 2.) For 06E valve plates, pry against the raised tab to break valve plate away from the compressor.

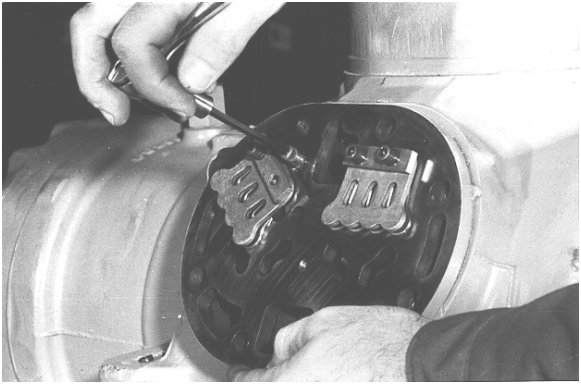


Fig. 2 — Disassembly of Valve Plate (Standard Efficiency Valve Plate Shown)

4. Pry up along sides of valve plate to remove valve plate from crankcase. This provides access to suction reed valves (see Fig. 3). Remove suction valves from dowel pins. On 06D and 06CC (16 to 37 Cfm) compressors, also remove the suction valve positioning springs (see Fig. 4).

5. Inspect components for wear or damage. If replacement is necessary, replace as a complete assembly. Individual parts must not be interchanged. Alignment of high efficiency discharge valves is critical for proper seating. See Sections 3.27 to 3.29, pages 84-87 for applicable replacement valve plate packages.

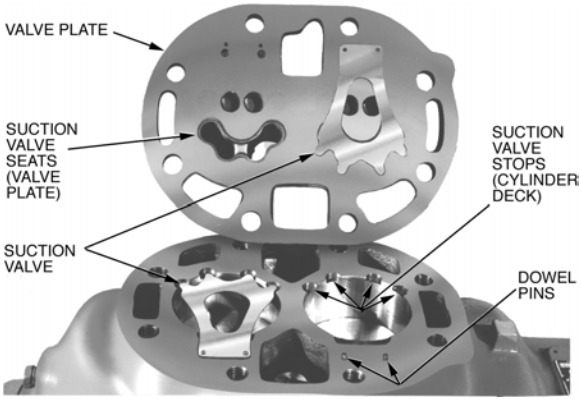


Fig. 3 — Valve Plate Removed (06E Refrigeration Valve Plate Shown)

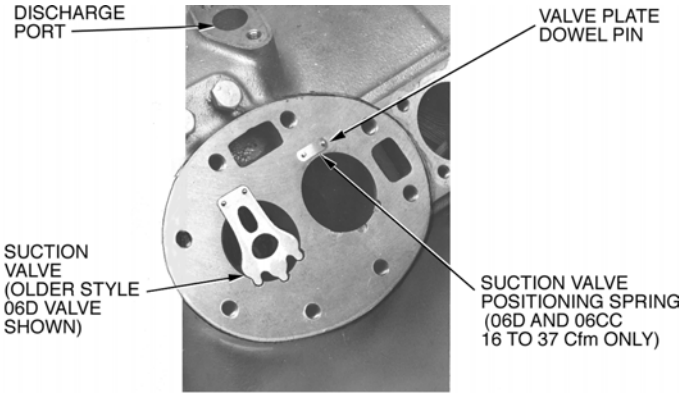

DISCHARGE PORT
VALVE PLATE DOWEL PIN
SUCTION VALVE (OLDER STYLE 06D VALVE SHOWN)
SUCTION VALVE POSITIONING SPRING (06D AND 06CC 16 TO 37 Cfm ONLY)

Fig. 4 — Suction Valve and Positioning Springs in Place (06D Shown)

REASSEMBLY

1. If reassembling existing components, do not interchange valves or turn them over. They must be reassembled in their original position. Install the suction valve positioning springs (06CC size 16 to 37 Cfm and 06D compressors only) on dowel pins. Assemble positioning springs with spring ends bearing against cylinder deck (Fig. 4), spring bow upward.

2. Install suction valve on dowel pins as follows:

   a. 06D compressors: install suction valves on top of positioning springs as mentioned in Step 1 above.

   b. 06E compressors: if compressor uses a suction valve and a backer valve (looks like a 1/2 a suction valve), backer valve must be installed before installing full size suction valve (Fig. 5).

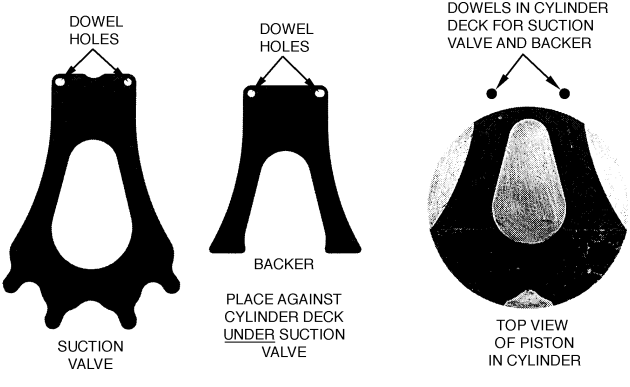

DOWEL HOLES
SUCTION VALVE
DOWEL HOLES
BACKER
PLACE AGAINST CYLINDER DECK UNDER SUCTION VALVE
DOWELS IN CYLINDER DECK FOR SUCTION VALVE AND BACKER
TOP VIEW OF PISTON IN CYLINDER

Fig. 5 — Piston, Suction Valve, and Backer Positions (06E)

3. Install new valve plate gasket. Using proper hold-down torque will prevent leaks.

   a. Fiber gaskets can be installed dry or lightly oiled. **Do not** soak gaskets in oil. If an oil-soaked gasket is overheated, it will bind to the metal, making the valve plate and/or the head difficult to remove.

   b. Metal gaskets must be installed dry.

4. Place valve plate on cylinder deck.

5. Install cylinder head gasket.

   NOTE: The center cylinder heads and unloader side heads use different gaskets from the plain side head. To confirm the gasket is correct, place it over the cylinder head and verify all exposed machined surfaces will be covered by the gasket.

   a. Line up the gasket with the cylinder head and valve plate.

   b. 06E compressor: secure the center rib with a cap screw and washer and torque to 4 to 6 ft-lbs. (5 to 8 Nm).

6. Replace cylinder head. To prevent high to low side leak in center of cylinder head gasket, torque 06D cylinder head cap screws to 30 to 35 ft-lbs. (40 to 48 Nm), and 06E cylinder head cap screws to 90-100 ft-lbs. (122 to 136 Nm).

   NOTE: Torque bolts in an alternating sequence pattern (top to bottom, left to right). Do not torque bolts in a circular pattern.

7. Certain high compression ratio applications develop high discharge gas temperatures which may cause the cylinder head and fiber valve plate gaskets to develop a set. Under these conditions the cap screws may lose hold-down torque. It is recommended that all gear cap screws be re-torqued 24 hours after new fiber gaskets are installed.

   NOTE: Compressors with metal core gaskets do not require re-torque.

REMOVE, INSPECT AND REPLACE BEARING HEAD ASSEMBLY

An oil pressure tap is located in the bearing head assembly used on all 06D refrigeration duty, newer 06D A/C duty, and all 06E refrigeration and A/C duty compressors (Fig. 6 and Fig. 7).

For 06D, E, CC oil pressure, see page 73, Section 3.11.

The oil pump assembly is contained in the pump end bearing head aluminum casting. The pump end main bearing is a machined part of this casting. No insert bearing is required.

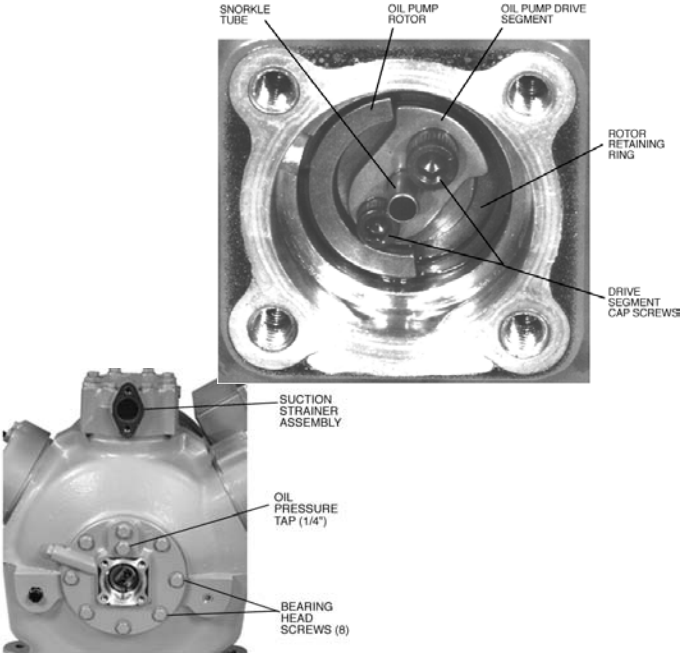


Fig. 6 — Removing Pump End Bearing Head (06D Compressor)

1. a. To disassemble, first remove four (4) cap screws from the bearing head cover plate and remove the oil feed guide vane and spring.

   b. Remove the two (2) drive segment cap screws from the end of the crankshaft (see Fig. 6 and Fig. 7). **These screws must be removed before the bearing head can be removed.**

2. Remove the eight (8) cap screws holding the bearing head assembly to the crankcase. Remove the bearing head assembly by pulling forward.

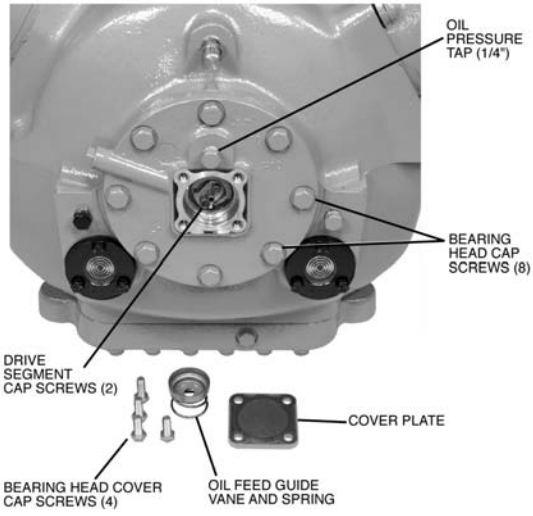


Fig. 7 — Removing Pump End Bearing Head (06E Compressor)

3. Inspect the bearing surfaces for evidence of wear or damage. If bearing surface is worn or scored, or if the oil pump is defective, the complete bearing head must be replaced (see replacement bearing head package listed below).

Compressor	Replacement Bearing Head Package
06CC, 16 to 37 Cfm, and all 06D	06DA660126
06CC, 50 to 99 Cfm, and all 06E	06EA660157

While bearing head is removed, inspect internal running gear for obvious problems (broken rods or pistons).

4. To reassemble, bolt the bearing head to the crankcase. Bolt torque:

   - 06CC, 16 to 37 Cfm, and all 06D: 30 to 35 ft-lb. (40 to 48 Nm)
   - 06CC, 50 to 99 Cfm, and all 06E: 55 to 60 ft-lb. (75 to 81 Nm)

5. Bolt the drive segment (replace if worn) to the crankshaft. Bolt torque:

   - No. 10 Screw: 4 to 6 ft-lb. (5 to 8 Nm)
   - 1.4 in. (6 mm) screw: 12 to 15 ft-lb. (16 to 20 Nm)

   IMPORTANT: The 1/4 in. snorkle tube should face away from the crankshaft (Fig. 6).

6. Insert the oil feed guide vane with the **large diameter inward**. Place the oil feed vane spring **over small diameter** of guide vane (**do not install spring before installing guide vane**). Install pump cover plate (bolt torque: 16 to 20 ft-lb. or 22 to 27 Nm).

   NOTE: Do not over-torque or aluminum threads in bearing head could be stripped.

MOTOR BURNOUT CLEAN-UP PROCEDURE

When a hermetic motor burns out, the stator winding decomposes and forms carbon, water, and acid, which contaminate refrigerant systems. These contaminants must be removed from the system to prevent repeat motor failures. See Carlyle/Carrier recommendation procedures for clean-up after burnout in semi-hermetic compressors - form #06DA604782.

⚠ WARNING

Before attempting service work on the compressor, see safety precautions listed in Section 2.3, pages 20 to 31, and on compressor terminal box cover. Also follow any installation instructions provided with the replacement compressor. **Failure to follow these instructions could result in equipment damage or serious personal injury.**

1. Determine cause of burnout and make necessary corrections.

    a. Inspect control box for blown fuses, welded starter contacts, welded overload contacts or burned out heater elements.

    b. Inspect compressor terminal plate for burned or damaged terminals and insulation, and shorted or grounded terminals.

    c. Inspect unit wiring for loose power connections.

    d. Check for power supply fluctuation beyond design limits (voltage too high or too low). If power supply is a problem, provide the appropriate system protector.

2. Close compressor suction and discharge service valves and remove the refrigerant from the compressor using environmentally approved methods. Leave remaining refrigerant in system.

3. Remove damaged compressor and replace.

    a. Remove suction and discharge shut-off valve bolts and all other connections to damaged compressor.

    b. Remove damaged compressor and replace with a new compressor.

    c. On severe motor burnouts, be sure shut-off valves and suction or discharge lines are not contaminated. If contaminated, they

should be thoroughly cleaned or replaced before connecting to replacement compressor.

4. Install new liquid line filter-drier. If the system has a suction line filter-drier, replace the core.

5. Evacuate and dehydrate replacement compressor. Ensure oil in compressor is at the proper level.

   NOTE: Since most new and service compressors are now shipped without oil in the crankcase, you must check to see if there is oil. Adding or charging oil is usually easier prior to installing the compressor.

   - If there is no oil, add the appropriate oil for the service. Oil charges are listed in Sections 3.1 to 3.3, pages 62-67.

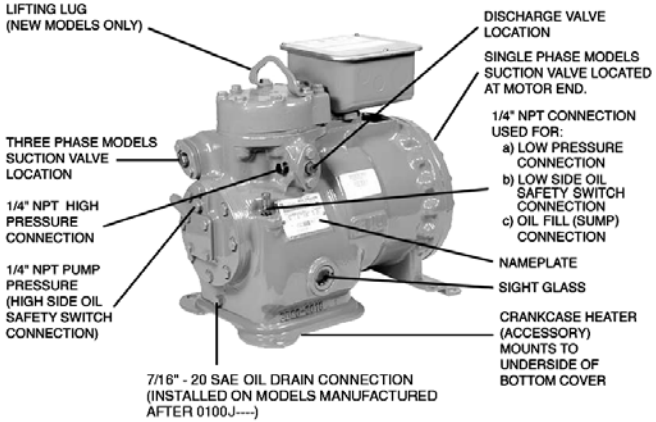
   - If there is oil, determine if it is compatible with the refrigerant. If the oil is not compatible, use the drain connection to remove the oil. Dispose of the removed oil following the appropriate environmental guidelines. Since the compressor has not been run, a thorough draining is all that is needed to remain within the limits of residual oil levels. There is no need to "flush" the compressor with the replacement oil. Once the oil is removed, add the appropriate oil (see above).

6. Place compressor in operation. After 2 to 4 hours of operation, inspect compressor oil for discoloration and/or acidity. If oil shows signs of contamination, replace oil and filter-driers and clean the suction strainer.

   NOTE: When testing for moisture and acidity be sure the test kit used is appropriate for the refrigerant (CFC, HCFC, or HFC) and the oil (mineral, alkylbenzene, or POE) in the system. Carrier's Total Test Kit is accurate for CFC and HCFC air-conditioning applications. If used with POE oils, Total Test Kit will indicate acid, but is not an accurate indicator of moisture.

7. Inspect oil daily for discoloration and acidity. If oil stays clean and acid-free, the system is clean. If oil shows signs of contamination, change oil, change filter-drier, and clean suction strainer. If filter-drier or suction strainer is dirty or discolored, repeat this step until system is cleaned.

2.5 — Connection Points, - 06D, 06E, and 06CC Compressors



NOTE: Bolt sizes and thread pitch: Compressors are built using English unit bolts. The bolts have no exact metric equivalents. Therefore, to prevent possible cross-threading, loose bolts, or damage to threaded portions of the casing, comparable metric measurements are not included.

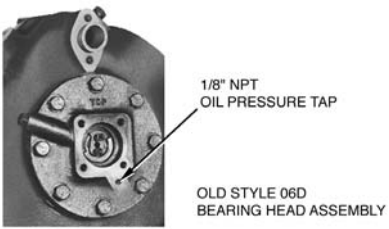
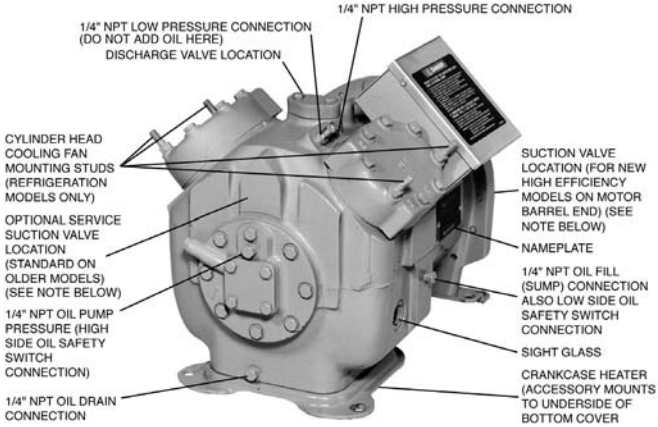


Fig. 8 — 06D 2-Cylinder Compressor Connection Points


1/4" NPT HIGH PRESSURE CONNECTION
1/4" NPT LOW PRESSURE CONNECTION (DO NOT ADD OIL HERE)
DISCHARGE VALVE LOCATION
CYLINDER HEAD COOLING FAN MOUNTING STUDS (REFRIGERATION MODELS ONLY)
OPTIONAL SERVICE SUCTION VALVE LOCATION (STANDARD ON OLDER MODELS) (SEE NOTE BELOW)
1/4" NPT OIL PUMP PRESSURE (HIGH SIDE OIL SAFETY SWITCH CONNECTION)
1/4" NPT OIL DRAIN CONNECTION
SUCTION VALVE LOCATION (FOR NEW HIGH EFFICIENCY MODELS ON MOTOR BARREL END) (SEE NOTE BELOW)
NAMEPLATE
1/4" NPT OIL FILL (SUMP) CONNECTION ALSO LOW SIDE OIL SAFETY SWITCH CONNECTION
SIGHT GLASS
CRANKCASE HEATER (ACCESSORY MOUNTS TO UNDERSIDE OF BOTTOM COVER

NOTES:

1. Bolt sizes and thread pitch: Compressors are built using English unit bolts. The bolts have no exact metric equivalents. Therefore, to prevent possible cross-threading, loose bolts, or damage to threaded portions of the casing, comparable metric measurements are not included.

2. The 13 and 16 Cfm service compressors are made with dual suction ports.

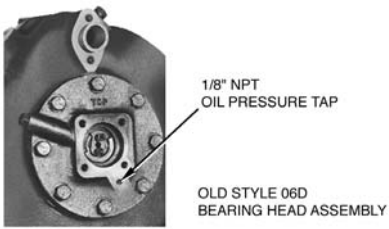
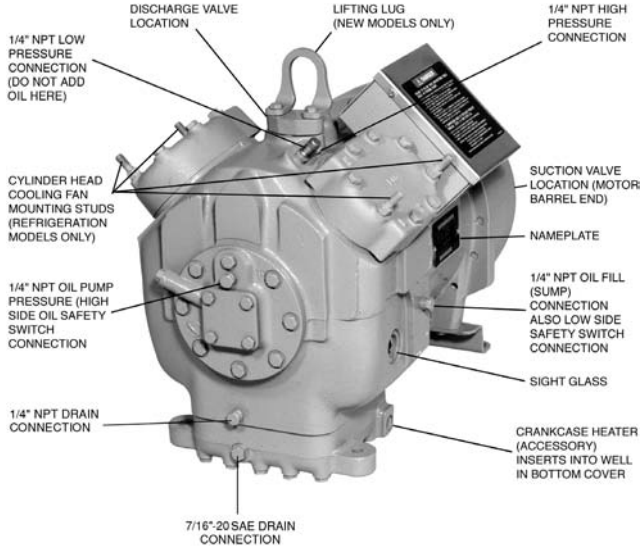


Fig. 9 — 06D 4-Cylinder Compressor (13 and 16 Cfm) Connection Points


DISCHARGE VALVE LOCATION
LIFTING LUG (NEW MODELS ONLY)
1/4" NPT HIGH PRESSURE CONNECTION
1/4" NPT LOW PRESSURE CONNECTION (DO NOT ADD OIL HERE)
CYLINDER HEAD COOLING FAN MOUNTING STUDS (REFRIGERATION MODELS ONLY)
SUCTION VALVE LOCATION (MOTOR BARREL END)
NAMEPLATE
1/4" NPT OIL FILL (SUMP) CONNECTION ALSO LOW SIDE SAFETY SWITCH CONNECTION
1/4" NPT OIL PUMP PRESSURE (HIGH SIDE OIL SAFETY SWITCH CONNECTION
SIGHT GLASS
1/4" NPT DRAIN CONNECTION
CRANKCASE HEATER (ACCESSORY) INSERTS INTO WELL IN BOTTOM COVER
7/16"-20 SAE DRAIN CONNECTION

NOTE: Bolt sizes and thread pitch: Compressors are built using English unit bolts. The bolts have no exact metric equivalents. Therefore, to prevent possible cross-threading, loose bolts, or damage to threaded portions of the casing, comparable metric measurements are not included.

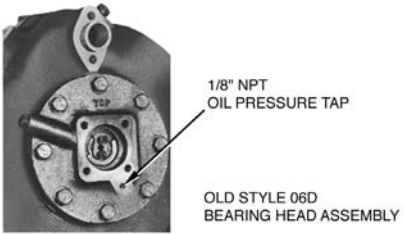
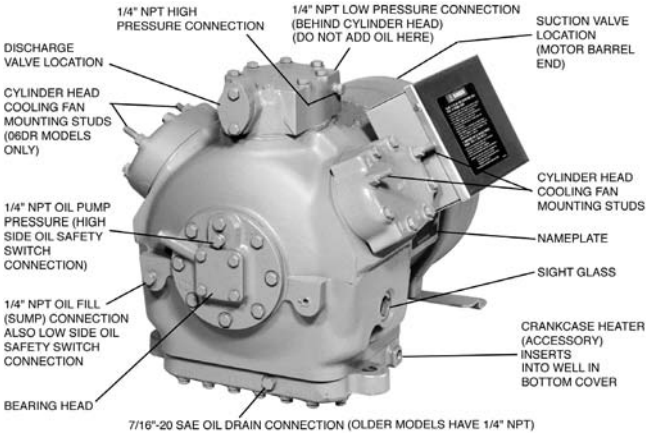


Fig. 10 — 06D 4-Cylinder Compressor (18 and 20 Cfm) Connection Points


1/4" NPT HIGH PRESSURE CONNECTION
1/4" NPT LOW PRESSURE CONNECTION (BEHIND CYLINDER HEAD) (DO NOT ADD OIL HERE)
SUCTION VALVE LOCATION (MOTOR BARREL END)
DISCHARGE VALVE LOCATION
CYLINDER HEAD COOLING FAN MOUNTING STUDS (06DR MODELS ONLY)
CYLINDER HEAD COOLING FAN MOUNTING STUDS
1/4" NPT OIL PUMP PRESSURE (HIGH SIDE OIL SAFETY SWITCH CONNECTION)
NAMEPLATE
SIGHT GLASS
1/4" NPT OIL FILL (SUMP) CONNECTION ALSO LOW SIDE OIL SAFETY SWITCH CONNECTION
CRANKCASE HEATER (ACCESSORY) INSERTS INTO WELL IN BOTTOM COVER
BEARING HEAD
7/16"-20 SAE OIL DRAIN CONNECTION (OLDER MODELS HAVE 1/4" NPT)

NOTE: Bolt sizes and thread pitch: Compressors are built using English unit bolts. The bolts have no exact metric equivalents. Therefore, to prevent possible cross-threading, loose bolts, or damage to threaded portions of the casing, comparable metric measurements are not included.

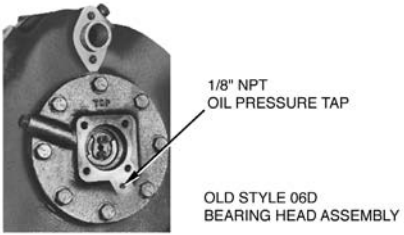
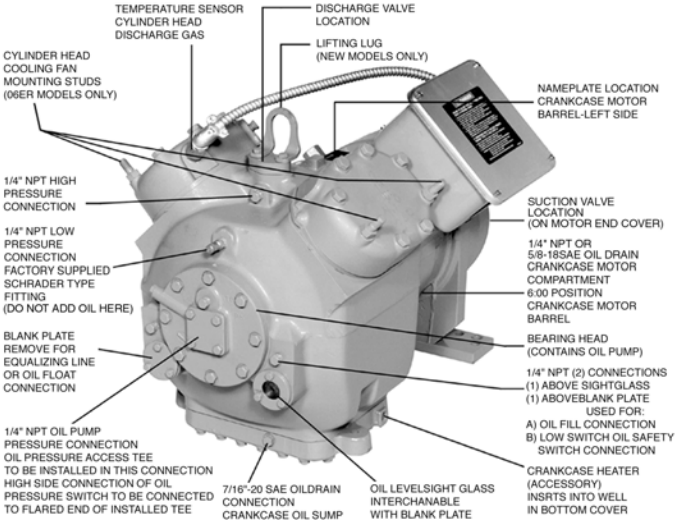
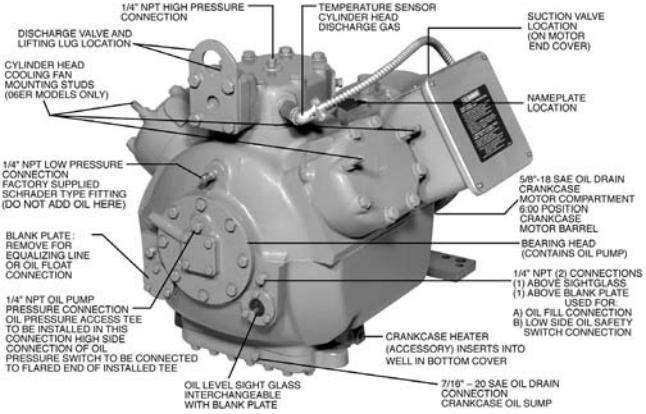


Fig. 11 — 06D 6-Cylinder Compressor (24, 25, 28, 37 and 41 Cfm) Connection Points


TEMPERATURE SENSOR CYLINDER HEAD DISCHARGE GAS
DISCHARGE VALVE LOCATION
LIFTING LUG (NEW MODELS ONLY)
CYLINDER HEAD COOLING FAN MOUNTING STUDS (06ER MODELS ONLY)
NAMEPLATE LOCATION CRANKCASE MOTOR BARREL-LEFT SIDE
1/4" NPT HIGH PRESSURE CONNECTION
SUCTION VALVE LOCATION (ON MOTOR END COVER)
1/4" NPT LOW PRESSURE CONNECTION FACTORY SUPPLIED SCHRADER TYPE FITTING (DO NOT ADD OIL HERE)
1/4" NPT OR 5/8-18SAE OIL DRAIN CRANKCASE MOTOR COMPARTMENT 6:00 POSITION CRANKCASE MOTOR BARREL
BLANK PLATE REMOVE FOR EQUALIZING LINE OR OIL FLOAT CONNECTION
BEARING HEAD (CONTAINS OIL PUMP)
1/4" NPT (2) CONNECTIONS (1) ABOVE SIGHTGLASS (1) ABOVEBLANK PLATE USED FOR: A) OIL FILL CONNECTION B) LOW SWITCH OIL SAFETY SWITCH CONNECTION
1/4" NPT OIL PUMP PRESSURE CONNECTION OIL PRESSURE ACCESS TEE TO BE INSTALLED IN THIS CONNECTION HIGH SIDE CONNECTION OF OIL PRESSURE SWITCH TO BE CONNECTED TO FLARED END OF INSTALLED TEE
7/16"-20 SAE OILDRAIN CONNECTION CRANKCASE OIL SUMP
OIL LEVELSIGHT GLASS INTERCHANABLE WITH BLANK PLATE
CRANKCASE HEATER (ACCESSORY) INSRTS INTO WELL IN BOTTOM COVER

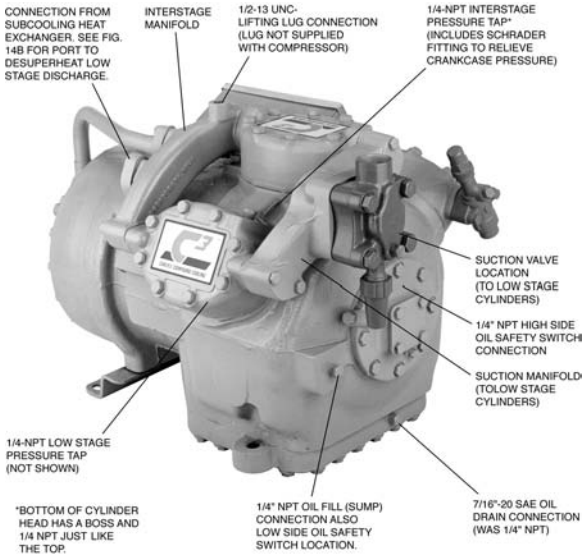
NOTE: Bolt sizes and thread pitch: Compressors are built using English unit bolts. The bolts have no exact metric equivalents. Therefore, to prevent possible cross-threading, loose bolts, or damage to threaded portions of the casing, comparable metric measurements are not included.

Fig. 12 — 06E 4-Cylinder Compressor (50 and old 66 Cfm) Connection Points


1/4" NPT HIGH PRESSURE CONNECTION
TEMPERATURE SENSOR CYLINDER HEAD DISCHARGE GAS
SUCTION VALVE LOCATION (ON MOTOR END COVER)
DISCHARGE VALVE AND LIFTING LUG LOCATION
CYLINDER HEAD COOLING FAN MOUNTING STUDS (06ER MODELS ONLY)
NAMEPLATE LOCATION
1/4" NPT LOW PRESSURE CONNECTION FACTORY SUPPLIED SCHRADER TYPE FITTING (DO NOT ADD OIL HERE)
5/8"-18 SAE OIL DRAIN CRANKCASE MOTOR COMPARTMENT 6:00 POSITION CRANKCASE MOTOR BARREL
BLANK PLATE: REMOVE FOR EQUALIZING LINE OR OIL FLOAT CONNECTION
BEARING HEAD (CONTAINS OIL PUMP)
1/4" NPT (2) CONNECTIONS (1) ABOVE SIGHTGLASS (1) ABOVE BLANK PLATE USED FOR: A) OIL FILL CONNECTION B) LOW SIDE OIL SAFETY SWITCH CONNECTION
1/4" NPT OIL PUMP PRESSURE CONNECTION OIL PRESSURE ACCESS TEE TO BE INSTALLED IN THIS CONNECTION HIGH SIDE CONNECTION OF OIL PRESSURE SWITCH TO BE CONNECTED TO FLARED END OF INSTALLED TEE
CRANKCASE HEATER (ACCESSORY) INSERTS INTO WELL IN BOTTOM COVER
OIL LEVEL SIGHT GLASS INTERCHANGEABLE WITH BLANK PLATE
7/16" – 20 SAE OIL DRAIN CONNECTION CRANKCASE OIL SUMP

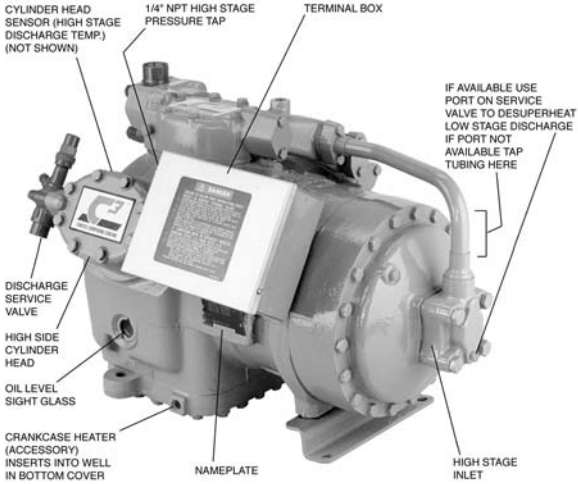
NOTE: Bolt sizes and thread pitch: Compressors are built using English unit bolts. The bolts have no exact metric equivalents. Therefore, to prevent possible cross-threading, loose bolts, or damage to threaded portions of the casing, comparable metric measurements are not included.

Fig. 13 — 06E 6-Cylinder Compressor (65, 75, 99 Cfm) Connection Points


CONNECTION FROM SUBCOOLING HEAT EXCHANGER. SEE FIG. 14B FOR PORT TO DESUPERHEAT LOW STAGE DISCHARGE.
INTERSTAGE MANIFOLD
1/2-13 UNC- LIFTING LUG CONNECTION (LUG NOT SUPPLIED WITH COMPRESSOR)
1/4-NPT INTERSTAGE PRESSURE TAP* (INCLUDES SCHRADER FITTING TO RELIEVE CRANKCASE PRESSURE)
SUCTION VALVE LOCATION (TO LOW STAGE CYLINDERS)
1/4" NPT HIGH SIDE OIL SAFETY SWITCH CONNECTION
SUCTION MANIFOLD (TOLOW STAGE CYLINDERS)
1/4-NPT LOW STAGE PRESSURE TAP (NOT SHOWN)
*BOTTOM OF CYLINDER HEAD HAS A BOSS AND 1/4 NPT JUST LIKE THE TOP.
1/4" NPT OIL FILL (SUMP) CONNECTION ALSO LOW SIDE OIL SAFETY SWITCH LOCATION.
7/16"-20 SAE OIL DRAIN CONNECTION (WAS 1/4" NPT)

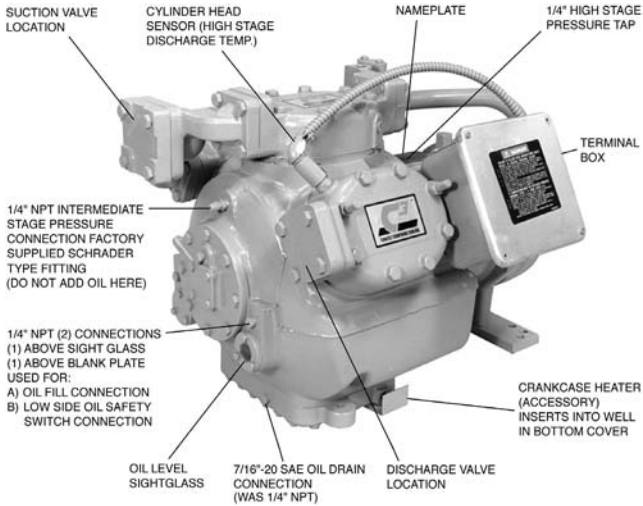
NOTE: Bolt sizes and thread pitch: Compressors are built using English unit bolts. The bolts have no exact metric equivalents. Therefore, to prevent possible cross-threading, loose bolts, or damage to threaded portions of the casing, comparable metric measurements are not included.

Fig. 14A — 06CC Compressor (16 to 37 Cfm), 06D Body Pump End Connection Points


CYLINDER HEAD SENSOR (HIGH STAGE DISCHARGE TEMP.) (NOT SHOWN)
1/4" NPT HIGH STAGE PRESSURE TAP
TERMINAL BOX
IF AVAILABLE USE PORT ON SERVICE VALVE TO DESUPERHEAT LOW STAGE DISCHARGE IF PORT NOT AVAILABLE TAP TUBING HERE
DISCHARGE SERVICE VALVE
HIGH SIDE CYLINDER HEAD
OIL LEVEL SIGHT GLASS
CRANKCASE HEATER (ACCESSORY) INSERTS INTO WELL IN BOTTOM COVER
NAMEPLATE
HIGH STAGE INLET

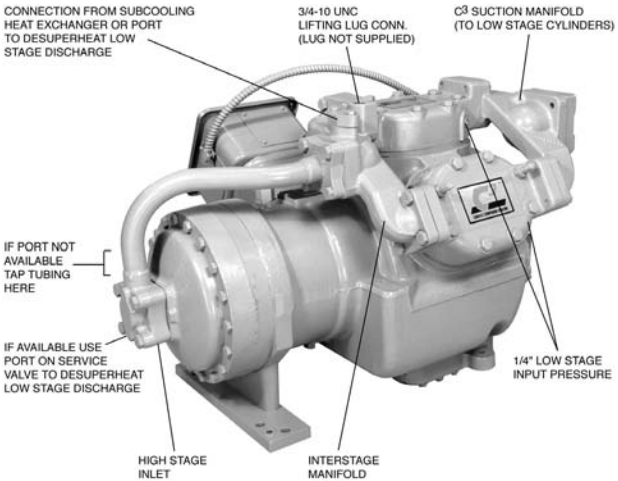
NOTE: Bolt sizes and thread pitch: Compressors are built using English unit bolts. The bolts have no exact metric equivalents. Therefore, to prevent possible cross-threading, loose bolts, or damage to threaded portions of the casing, comparable metric measurements are not included.

Fig. 14B — 06CC Compressor (16 to 37 Cfm), 06D Body Motor End Connection Points


SUCTION VALVE LOCATION
CYLINDER HEAD SENSOR (HIGH STAGE DISCHARGE TEMP.)
NAMEPLATE
1/4" HIGH STAGE PRESSURE TAP
TERMINAL BOX
1/4" NPT INTERMEDIATE STAGE PRESSURE CONNECTION FACTORY SUPPLIED SCHRADER TYPE FITTING (DO NOT ADD OIL HERE)
1/4" NPT (2) CONNECTIONS
(1) ABOVE SIGHT GLASS
(1) ABOVE BLANK PLATE
USED FOR:
A) OIL FILL CONNECTION
B) LOW SIDE OIL SAFETY SWITCH CONNECTION
CRANKCASE HEATER (ACCESSORY) INSERTS INTO WELL IN BOTTOM COVER
OIL LEVEL SIGHTGLASS
7/16"-20 SAE OIL DRAIN CONNECTION (WAS 1/4" NPT)
DISCHARGE VALVE LOCATION

NOTE: Bolt sizes and thread pitch: Compressors are built using English unit bolts. The bolts have no exact metric equivalents. Therefore, to prevent possible cross-threading, loose bolts, or damage to threaded portions of the casing, comparable metric measurements are not included.

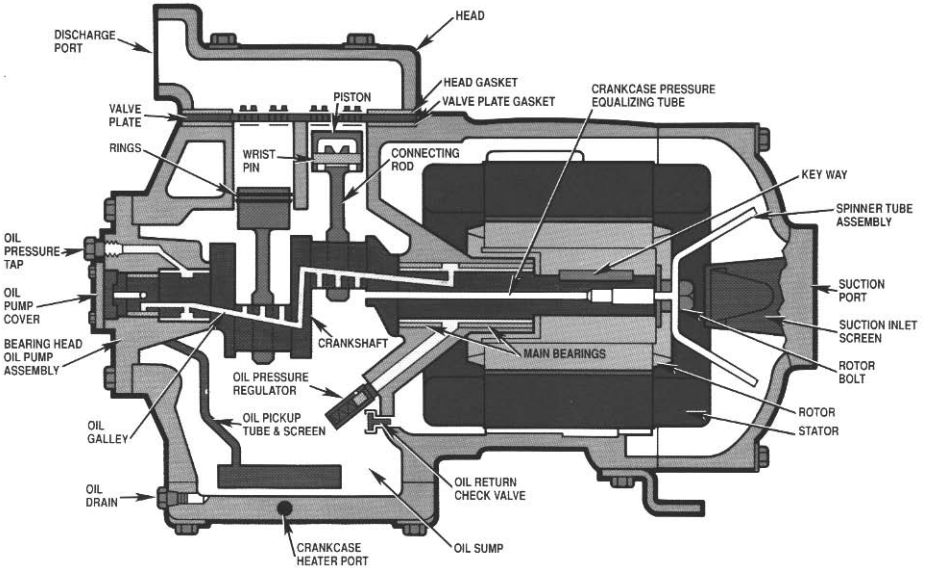
Fig. 15A— 06CC Compressor (50 to 99 Cfm), 06E Body Pump End Connection Points


CONNECTION FROM SUBCOOLING HEAT EXCHANGER OR PORT TO DESUPERHEAT LOW STAGE DISCHARGE
3/4-10 UNC LIFTING LUG CONN. (LUG NOT SUPPLIED)
C3 SUCTION MANIFOLD (TO LOW STAGE CYLINDERS)
IF PORT NOT AVAILABLE TAP TUBING HERE
IF AVAILABLE USE PORT ON SERVICE VALVE TO DESUPERHEAT LOW STAGE DISCHARGE
1/4" LOW STAGE INPUT PRESSURE
HIGH STAGE INLET
INTERSTAGE MANIFOLD

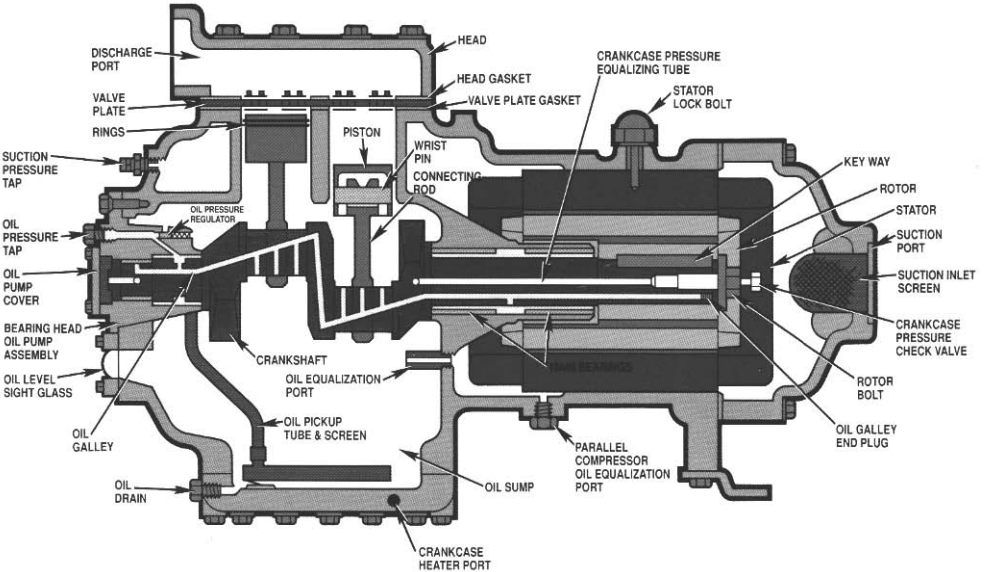
NOTE: Bolt sizes and thread pitch: Compressors are built using English unit bolts. The bolts have no exact metric equivalents. Therefore, to prevent possible cross-threading, loose bolts, or damage to threaded portions of the casing, comparable metric measurements are not included.

Fig. 15B — 06CC Compressor (50 to 99 Cfm), 06E Body Motor End Connection Points

2.6 — Cross-Sectional View, 06D Semi-Hermetic Compressor

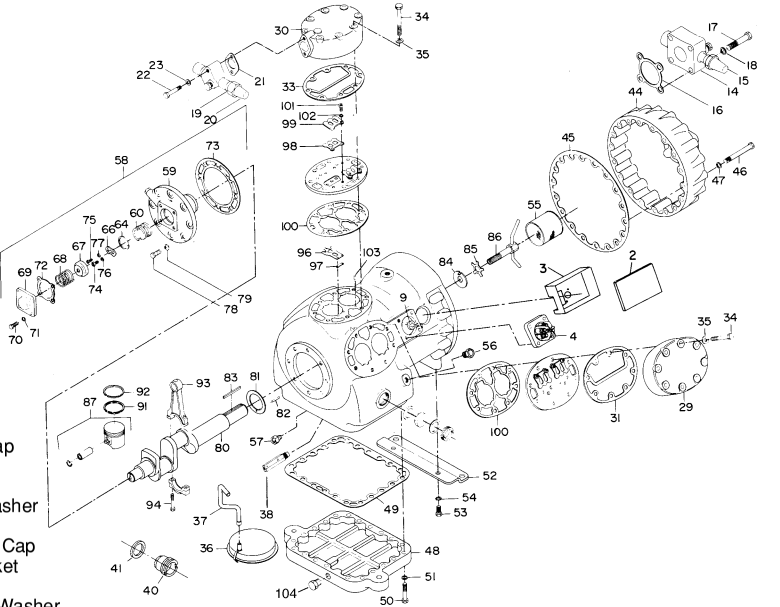


2.7 –– Cross-Sectional View, 06E Semi-Hermetic Compressor



2.8 — Exploded View – 6-Cylinder 06D Compressor

Complete parts breakdown shown for reference only. Some parts may be pictured prior to design changes and not all parts are available as replacements.



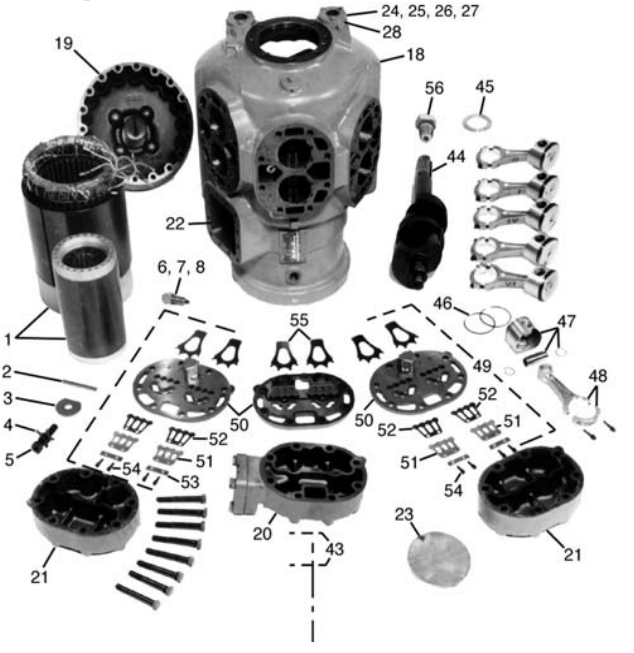
LEGEND

- 2 – Terminal Box Cover
- 3 – Terminal Box
- 4 – Terminal Plate Assembly
- 9 – Grommet (for power leads)
- 14 – Suction Service Valve
- 15 – Suction Service Valve Seal Cap
- 16 – Suction Service Valve Gasket
- 17 – Suction Service Valve Bolt
- 18 – Suction Service Valve Bolt Washer
- 19 – Discharge Service Valve
- 20 – Discharge Service Valve Seal Cap
- 21 – Discharge Service Valve Gasket
- 22 – Discharge Service Valve Bolt
- 23 – Discharge Service Valve Bolt Washer
- 29 – Standard Side Bank Cylinder Head

30 – Center Bank Cylinder
31 – Standard Side Bank Cylinder Head Gasket (Unloader Side Bank Head not shown)
33 – Center Bank Cylinder Head Gasket
34 – Cylinder Head Cap Screw
35 – Cylinder Head Cap Screw Gasket
36 – Oil Filter Screen Assembly
37 – Oil Suction Tube
38 – Oil Relief Valve Assembly
40 – Oil Level Sight Glass Assembly
41 – Oil Level Sight Glass Gasket
44 – Motor End Cover
45 – Motor End Cover Gasket
46 – Motor End Cover Cap Screw
47 – Motor End Cover Cap Screw Washer
48 – Bottom Cover Plate
49 – Bottom Plate Gasket
50 – Bottom Plate Cap Screw
51 – Bottom Plate Cap Screw Washer
52 – Compressor Foot
53 – Compressor Foot Screw
54 – Compressor Foot Everlockwasher
55 – Suction Strainer Assembly
56 – Oil Bypass Plug
57 – Oil Return Check Valve Assembly
58 – Pump End Bearing Head Assembly
59 – Bearing Head
60 – Pump Rotor
64 – Pump Rotor Retaining Ring
66 – Drive Segment
67 – Oil Feed Guide Vane
68 – Oil Feed Vane Spring
69 – Cover Plate
70 – Cover Plate Cap Screw
71 – Cover Plate Cap Screw Gasket
72 – Cover Plate Gasket
73 – Bearing Head Gasket
74 – Cap Screws & Lockwashers
75 – Cap Screws & Lockwashers
76 – Cap Screws & Lockwashers
77 – Cap Screws & Lockwashers
78 – Bearing Head Cap Screw
79 – Bearing Head Cap Screw Washer
80 – Crankshaft
81 – Thrust Washer
82 – Spirol Pin
83 – Rotor Drive Key
84 – Rotor Washer
85 – Rotor Lockwasher
86 – Equalizer Tube Assembly
87 – Piston Assembly
91 – Oil Ring (Not All Models)
92 – Compression Ring
93 – Connecting Rod & Cap Assembly
94 – Connecting Rod Cap Screw
96 – Suction Valve
97 – Suction Valve Positioning Spring
98 – Discharge Valve
99 – Discharge Valve Stop
100 – Valve Plate Gasket
101 – Discharge Valve Stop Cap Screw
102 – Discharge Valve Stop Lockwasher
103 – Valve Plate Dowel
104 – Oil Drain Plug, (New Design SAE Fitting and O-Ring)

2.9 — Exploded View – 6-Cylinder 06E Compressor

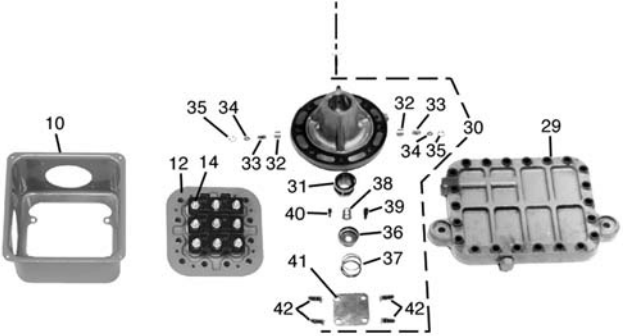
Complete parts breakdown shown for reference only. Some parts may be pictured prior to design changes and not all parts are available as replacements.



LEGEND

1 – Compressor Motor – Stator and Rotor
2 – Motor Key
3 – Rotor Plate Washer
4 – Rotor Lock Washer
5 – Rotor Lock Bolt
6 – Motor Lock Bushing
7 – Roll Pin
8 – Acorn Nut and Gasket

10 – Terminal Box Assembly
12 – Terminal Plate Assembly
14 – Terminal Bolt Assembly
18 – Compressor Crankcase
19 – Motor End Cover
20 – Cylinder Head - Center Bank
21 – Cylinder Head - Side Bank
(Unloader Head Not Shown)
22 – Internal Relief Valve
23 – Crankcase Oil Filter Screen
24 – Oil Sight Glass Assembly
25 – Oil Sight Glass "O" Ring Gasket
26 – Oil Sight Glass Screw
27 – Oil Sight Glass Lock Washer
28 – Pipe Plug Gasket (Hex Head)
29 – Bottom Cover Plate
30 – Pump End Bearing Head Assembly
31 – Pump Rotor
32 – Pump Vane
33 – Pump Vane Spring
34 – Pump Vane Spring Guide
35 – Retaining Spring Guide
36 – Oil Feed Guide Vane
37 – Oil Feed Guide Vane Spring
38 – Oil Pump Drive Segment
39 – Screw, Soc Head 1/4 – 28 x 5/8-in.
40 – Screw, Soc Head #10 – 32 x 1/2-in.
41 – Cover Plate
42 – Cover Plate Cap Screw
43 – Oil Relief Piston
44 – Crankshaft
45 – Bearing Washer
46 – Piston Rings (Oil and Compression)



47 – Piston, Piston Pin and Retaining Ring Assembly
48 – Connecting Rod and Cap Assembly
49 – Valve Plate Assembly
50 – Valve Plate
51 – Discharge Valve Stop
52 – Discharge Valve
53 – Valve Stop Support
54 – Cap Screw, Valve Stop
55 – Suction Valve (Backers For A/C Models Not Shown
see Fig. 5, page 36)
56 – Check Valve (Use Only with Parallel Compressor
Installations)

2.10 – Torque Guide – All 06D and 16 to 37 Cfm 06CC Compressors

SIZE DIAMETER (in.)	THREADS PER INCH	TORQUE RANGE (FT-LB)	TORQUE RANGE (NM)	USAGE
1/16	Pipe	8-12	11-16	Pipe plug crankshaft
1/8	Pipe	6-10	8-14	Oil return check valve
No. 10	32	4-6	5-8	Oil pump drive segment
1/4	Pipe	20-25	27-34	Pipe plug
1/4	20	10-12	14-16	Con-rod cap screw
1/4	28	12-15	16-20	Baffle plate crankshaft Side shield Oil pump drive segment Unloader
5/16	18	16-20 16-20 16-20 16-20 16-20 16-20 20-25 20-25	22-27 22-27 22-27 22-27 22-27 22-27 27-34 27-34	Cover plate bearing head Terminal plate cap screw Interstage outlet (CC) Interstage manifold (CC) Liquid injection (CC) Suction manifold (CC) Suction service valve Discharge service valve
3/8	16	30-35	40-48	P.E. bearing head, crankcase Bottom plate, crankcase Compressor foot Cylinder head Motor end cover, crankcase
3/8	24-SAE	6-12	8-16	P.E. bearing head at 10-O'clock position NOTE: Not a field usable fitting
7/16	14	55-60	75-81	Motor end cover, crankcase
7-16	20-SAE	6-12	8-16	Oil drain, on bottom cover plate 4-cyl (18-20 Cfm) and 6-cyl 06D
1/2	20	10-12	14-16	Oil pressure regulator
1/2	13	80-90	109-122	Suction service valve
5/8	11	25-30	34-40	Equalization spinner tube assembly
1-1/2	18	35-45	48-61	Oil level sight glass

(CC) - Compound cooling compressors only
NM - Newton meter (metric torque rating)
SAE - Society of Automotive Engineers
* See Fig 17 page 111 for jam locations

Torque for jam nut #3 is for compressors manufactured after 0203J---. For compressors built before this, jumper bar must be under jam nut #3 or Loctite #089 applied to jam nut #2, or use 12 ft. lb.

NOTE: Bolt sizes and thread pitch: Compressors are built using English unit bolts. The bolts have no exact metric equivalents. Therefore, to prevent possible cross-threading, loose bolts, or damage to threaded portions of the casing, comparable metric measurements are not included.

2.11 – Torque Guide – 06E and 06CC (50 to 99 Cfm) Compressors

SIZE DIAMETER (in.)	THREADS PER INCH	TORQUE RANGE (FT-LB)	TORQUE RANGE (NM)	USAGE
1/16	Pipe	8-12	11-16	Pipe plug crankshaft
1/8	Pipe	10-12	14-16	Orifice crankcase
No. 10	32	4-6	5-8	Oil pump drive segment
1/4	20	10-12 1.5-2.5	14-16 2-3	Con-rod cap screw Motor lead set screw terminal plate
1/4	28	3-5 4-6 12-15 12-15 12-15 12-15	4-7 5-8 16-20 16-20 16-20 16-20	Sight glass Cylinder head gasket tab screw Terminal box Unloader valve Discharge valve stop Oil pump drive segment
5/16	18	16-20 20-25	22-27 27-34	Cover plate bearing head Discharge service valve (4-cyl.)
3/8	16	3-5 3 18 10-20 30-35 30-35 30-35	4-7 4 25 14-17 40-48 40-48 40-48	Terminal post jam nut #1* Terminal post jam nut #2* Terminal post jam nut #3* Oil plug bearing head Bottom plate, crankcase Compressor foot Terminal block
3/8	24-SAE	8-12	11-16	P.E. Bearing head at 10 O'Clock position
5/8	18-SAE	25-40	27-54	Access port under motor barrel
7/16	14	55-60 55-60	75-81 75-81	Motor end cover, crankcase Bearing head, crankcase
7/16	20-SAE	8-12	11-16	Oil drain, on bottom plate
1/2	13	80-90 80-90 80-90 85-100 85-100 85-100	109-122 109-122 109-122 115-136 115-136 115-136	Discharge service valve (6-cyl.) Interstage outlet (CC) Suction service valve (1 5/8) Interstage manifold (CC) Suction manifold (CC) Cylinder head
1/2	Pipe	30-40	40-54	Cylinder head sensor
5/8	11	25-30 90-100	34-40 122-136	Rotor lock crankshaft Suction service valve (2 1/8)
3/4	16	50-60	68-81	Stator lock acorn nut
1 1/8	18	30-40	40-54	Pressure relief valve

See Table 2.10 for Notes and Legend (page 60).

3.0 – COMPRESSOR AND PARTS DATA

3.1 – 06D Series Compressors – Physical Data (page 1 of 2)

CARRIER/ CARLYLE MODEL NUMBER	STANDARD SERVICE REPLACEMENT MODEL	SUCTION TEMPERATURE RANGE ... (a)					
		R-404A/507 & R-502		R-134a & R-12		R-22	
		Deg. F	Deg. C	Deg. F	Deg. C	Deg. F	Deg. C
06DM8080...	06DM8086...	0 to 50	-18 to 10	-	-	0 to 55	-18 to 13
06DR1090...	06DR1096...(b)	-40 to 0*	-40 to -18*	-10 to 55	-23 to 13	-35 to 0 †	-37 to -18†
06DR0130...	06DR0136...(c)	-40 to 0*	-40 to -18*	-10 to 55	-23 to 13	-35 to 0 †	-37 to -18†
06DM3130...	06DM3136...(c)	0 to 50	-18 to 10	-	-	0 to 45	-18 to 7
06DR3160...	06DR3166...(c)	-40 to 25*	-40 to -4*	-10 to 55	-23 to 13	-35 to 25†	-37 to -4 †
06DM3160...	06DM3166...(c)	0 to 25	-18 to -4	-10 to 55	-23 to 13	0 to 45	-18 to 7
06DR7180...	06DR7186...	-40 to 0*	-40 to -18*	-10 to 55	-23 to 13	-35 to 0 †	-37 to -18†
06DA8182...	06DA8186...	0 to 50	-18 to 10	-	-	0 to 55	-18 to 13
06DR8200...	06DR8206...	-40 to 40*	-40 to 4*	-10 to 55	-23 to 13	-40 to 25†	-40 to -4 †
06DR7240...	06DR7246...	-40 to 25*	-40 to -4*	-10 to 55	-23 to 13	-40 to 25†	-40 to -4 †
06DR7250...	06DR7256...	-40 to 25*	-40 to -4*	-10 to 55	-23 to 13	-40 to 25†	-40 to -4 †
06DA8242...	06DA8246...	0 to 50	-18 to 10	-	-	0 to 55	-18 to 13
06DA8252...	06DA8256...	0 to 50	-18 to 10	-	-	0 to 55	-18 to 13
06DR2280...	06DR2286...	-40 to 25*	-40 to -4*	-10 to 55	-23 to 13	-40 to 25†	-40 to -4 †
06DA3282...	06DA3286...	0 to 50	-18 to 10	-	-	0 to 55	-18 to 13
06DR3370...	06DR3376...	-40 to 25*	-40 to -4*	-10 to 55	-23 to 13	-40 to 25†	-40 to -4 †
06DM3370...	06DM3376...	0 to 25	-18 to 10	-10 to 55	-23 to 13	0 to 45	-18 to 7
06DA5372...	06DA5376...	0 to 50	-18 to 10	-	-	0 to 55	-18 to 13
06DR5410...	06DR5416...	-40 to 25*	-40 to -4*	-	-	-40 to 25†	-40 to -4 †

* Cylinder head fan required at SST of -20 Deg. F. (-29 deg. C.) and below for R-404A/R-507 and R-502.

† Cylinder head fan required at SST of 0 Deg. F. (-18 deg. C.) and below for R-22.

(a) Approximate condensing temperature ranges. CHECK ACTUAL PERFORMANCE DATA FOR ANY NEW APPLICATION, ESPECIALLY AT OR NEAR UPPER OR LOWER LIMIT: L.T.=70 to 120 Deg.F. (21 to 49 Deg.C.), M.T.=80 to 130 Deg.F. (27 TO 54 Deg.C.) and H.T. (R-22 only) = 80 TO 150 Deg.F. (27 to 66 Deg.C.).

(b) The 06DR 109 single phase compressor has a 3 HP (2.2 kW) motor.

(c) Service compressors have dual suction service valve locations, one on motor end and one near the oil pump.

3.1 – 06D Series Compressors – Physical Data (page 2 of 2)

CARRIER/ CARLYLE MODEL NUMBER	MOTOR SIZE		DISPLACEMENT At 1750 RPM				NO. OF CYL	BORE		STROKE		OIL CHARGE		NET WEIGHT	
	HP	kW	CFM	L/M	CFH	L/H (,000)		in.	mm	in.	mm	Pints	Liters	Lb	Kg
06DM8080...	3	2.2	8.0	227	480	13.59	2	2	50.8	1 1/4	31.8	3	1.4	160	73
06DR1090...	2 (b)	1.5	8.7	246	522	14.78	2	2	50.8	1 3/8	34.9	3	1.4	190	73
06DR0130...	3	2.2	13.0	368	786	22.26	4	2	50.8	1	25.4	4 1/2	2.1	230	104
06DM3130...	5	3.7	13.0	368	786	22.26	4	2	50.8	1	25.4	4 1/2	2.1	235	107
06DR3160...	5	3.7	15.9	450	954	27.01	4	2	50.8	1 1/4	31.8	4 1/2	2.1	235	107
06DM3160...	5	3.7	15.9	450	954	27.01	4	2	50.8	1 1/4	31.8	4 1/2	2.1	235	107
06DR7180...	5	3.7	18.3	518	1100	31.09	4	2	50.8	1 7/16	36.5	5 1/2	2.6	250	113
06DA8182...	6 1/2	4.9	18.3	518	1100	31.09	4	2	50.8	1 7/16	36.5	5 1/2	2.6	250	113
06DR8200...	6 1/2	4.9	20	566	1200	33.00	4	2	50.8	1 9/16	39.7	5 1/2	2.6	260	118
06DR7240...	6 1/2	4.9	23.9	677	1435	40.60	6	2	50.8	1 1/4	31.8	8	3.8	310	141
06DR7250...	6 1/2	4.9	23.9	677	1435	40.60	6	2	50.8	1 1/4	31.8	8	3.8	315	143
06DA8242...	7 1/2	5.6	23.9	677	1435	40.60	6	2	50.8	1 1/4	31.8	8	3.8	310	141
06DA8252...	7 1/2	5.6	23.9	677	1435	40.60	6	2	50.8	1 1/4	31.8	8	3.8	315	143
06DR2280...	7 1/2	5.6	28	793	1680	47.57	6	2	50.8	1 15/32	37.3	8	3.8	315	143
06DA3282...	10	7.5	28	793	1680	47.57	6	2	50.8	1 15/32	37.3	8	3.8	315	143
06DR3370...	10	7.5	37.1	1050	2225	63.03	6	2	50.8	1 15/16	49.2	8	3.8	325	147
06DM3370...	10	7.5	37.1	1050	2225	63.03	6	2	50.8	1 15/16	49.2	8	3.8	325	147
06DA5372...	15	11.2	37.1	1050	2225	63.03	6	2	50.8	1 15/16	49.2	8	3.8	325	147
06DR5410...	15	11.2	41.0	1161	2460	69.66	6	2	50.8	2 5/32	54.6	8	3.8	325	147

3.2 – 06E Series Compressors – Physical Data (page 1 of 2)

CARRIER CARLYLE MODEL NUMBER ...(d)	STANDARD SERVICE REPLACEMENT MODEL	SUCTION TEMPERATURE RANGE ...(a)					
		R-404A/507 & R-502		R-134a & R12		R-22	
		Deg. F	Deg. C	Deg. F	Deg. C	Deg. F	Deg. C
06ER450...	06EY450...	-40 to 0*	-40 to -18*	-10 to 55	-23 to 13	-35 to 0 †	-37 to -18 †
06EM450...	06EZ450...	0 to 25	-18 to -4	-10 to 55	-23 to 13	0 to 45	-18 to 7
06EA550...	06ET250...	0 to 50	-18 to 10	-	-	0 to 55	-18 to 13
06ER166...(e)	06EY466...	-40 to 0	-40 to -18*	-10 to 55	-23 to 13	-35 to 0†	-37 to -18†
06EM266...(e)	06EZ266...	0 to 45*	-18 to 7	-10 to 55	-23 to 13	0 to 50	-18 to 10
06ER465...	06EY465...	-40 to 0*	-40 to -18*	-10 to 55	-23 to 13	-35 to 0 †	-37 to -18 †
06EA565...	06ET265...	0 to 50	-18 to 10	-10 to 55	-23 to 13	0 to 55	-18 to 13
06ER475...	06EY475...	-40 to 0*	-40 to -18*	-10 to 55	-23 to 13	-35 to 0 †	-37 to -18 †
06EM475...	06EZ475...	0 to 40	-18 to 4	-10 to 55	-23 to 13	0 to 45	-18 to 7
06EA575...	06ET275...	0 to 50	-18 to 10	-	-	0 to 55	-18 to 13
06ER399...	06EY399...	-40 to 0*	-40 to -18*	-10 to 55	-23 to 13	-35 to 0 †	-37 to -18 †
06EM499...	06EZ499...	0 to 40	-18 to 4	-10 to 55	-23 to 13	0 to 45	-18 to 7
06EA599...	06ET299...	0 to 50	-18 to 10	-	-	0 to 55	-18 to 13

* Cylinder head fan required at SST of -20 Deg. F. (-29 deg. C.) and below for R-404A/R-507 and R-502.
† Cylinder head fan required at SST of 0 Deg. F. (-18 deg. C.) and below for R-22.
(a) Approximate condensing temperature ranges. CHECK ACTUAL PERFORMANCE DATA FOR ANY NEW APPLICATION, ESPECIALLY AT OR NEAR UPPER OR LOWER LIMIT: L.T.=70 to 120 Deg.F. (21 to 49 Deg.C.), M.T.=80 to 130 Deg.F. (27 TO 54 Deg.C.) and H.T. (R-22 only) = 80 TO 150 Deg.F. (27 to 66 Deg.C.).
(d) The models shown are new oil-less models. Models with oil had a 0, 1 or 2 in the 5th digit of the model number.
(e) The 06ER166 and 06EM266 models are no longer built new, but service replacements are built and available. For new applications, the 06ER166 and 06EM266 models have been replaced by the 06ER465 and 06EA565.

3.2 – 06E Series Compressors – Physical Data (page 2 of 2)

CARRIER/ CARLYLE MODEL NUMBER	MOTOR SIZE		DISPLACEMENT At 1750 RPM				NO. OF CYL	BORE		STROKE		OIL CHARGE		NET WEIGHT	
	HP	kW	CFM	L/M	CFH	L/H (,000)		in.	mm	in.	mm	Pints	Liters	Lb	Kg
06ER450...	15	11.2	50.3	1424	3016	85.45	4	2 11/16	68.3	2 3/16	55.6	14	6.6	430	195
06EM450...	15	11.2	50.3	1424	3016	85.45	4	2 11/16	68.3	2 3/16	55.6	14	6.6	430	195
06EA550...	20	14.9	50.3	1424	3016	85.45	4	2 11/16	68.3	2 3/16	55.6	14	6.6	430	195
06ER166...(e)	20	14.9	66.0	1869	3960	112.1	4	2 11/16	68.3	2 7/8	73.0	14	6.6	430	195
06EM266...(e)	25	18.6	66.0	1869	3960	112.1	4	2 11/16	68.3	2 7/8	73.0	14	6.6	430	195
06ER465...	20	14.9	68.3	1934	4096	116.0	6	2 11/16	68.3	1 63/64	50.4	19	9.0	480	218
06EA565...	25	18.6	68.3	1934	4096	116.0	6	2 11/16	68.3	1 63/64	50.4	19	9.0	485	220
06ER475...	20	14.9	75.4	2135	4524	128.1	6	2 11/16	68.3	2 3/16	55.6	19	9.0	490	222
06EM475...	25	18.6	75.4	2135	4524	128.1	6	2 11/16	68.3	2 3/16	55.6	19	9.0	490	222
06EA575...	30	22.4	75.4	2135	4524	128.1	6	2 11/16	68.3	2 3/16	55.6	19	9.0	490	222
06ER399...	30	22.4	99.0	2803	5940	168.2	6	2 11/16	68.3	2 7/8	73.0	19	9.0	500	227
06EM499...	35	26.1	99.0	2803	5940	168.2	6	2 11/16	68.3	2 7/8	73.0	19	9.0	505	229
06EA599...	40	29.8	99.0	2803	5940	168.2	6	2 11/16	68.3	2 7/8	73.0	19	9.0	520	236

3.3 – 06CC Series Compressors – Physical Data (page 1 of 2)

CARRIER CARLYLE MODEL NUMBER	STANDARD SERVICE REPLACEMENT MODEL	SUCTION TEMPERATURE RANGE ...(f)					
		R-404A/507		R-134A		R-22	
		Deg. F(h)	Deg. C(h)	Deg. F	Deg. C	Deg. F	Deg. C
06CC016...(g)	06CY016...	-40 to -10	-40 to -23	(i)	(i)	-40 to -10	-40 to -23
06CC018...(g)	06CY018...	-40 to -10	-40 to -23	(i)	(i)	-40 to -10	-40 to -23
06CC124...	06CY124...	-60 to -10	-51 to -23	(i)	(i)	-40 to -10	-40 to -23
06CC125...	06CY125...	-60 to -10	-51 to -23	(i)	(i)	-40 to -10	-40 to -23
06CC228...	06CY228...	-60 to -10	-51 to -23	(i)	(i)	-40 to -10	-40 to -23
06CC337...	06CY337...	-60 to -10	-51 to -23	(i)	(i)	-40 to -10	-40 to -23
06CC550...(g)	06CY550...	-40 to -10	-40 to -23	(i)	(i)	-40 to -10	-40 to -23
06CC665...	06CY665...	-60 to -10	-51 to -23	(i)	(i)	-40 to -10	-40 to -23
06CC675...	06CY675...	-60 to -10	-51 to -23	(i)	(i)	-40 to -10	-40 to -23
06CC899...	06CY899...	-60 to -10	-51 to -23	(i)	(i)	-40 to -10	-40 to -23

(f) Approximate condensing temperature ranges. CHECK ACTUAL PERFORMANCE DATA FOR ANY NEW APPLICATION, ESPECIALLY AT OR NEAR UPPER OR LOWER LIMIT: L.T. = 70 to 130 Deg.F. (21 to 55 Deg.C.).

(g) To provide a 6-cylinder body needed for Compound Cooling, the normal 4-cylinder model 16, 18 and 50 Cfm compressors are built using the 24, 18, and 65 Cfm 6-cylinder bodies respectively. The actual Cfm reduction is achieved by modifying the running gear.

(h) R404A/R-507 CANNOT be used in the small “D” body size Compound Cooling compressors (16 to 37 Cfm), manufactured prior to Serial No. 2099J.

(i) R-134a and R-12 CANNOT be used in any Compound Cooling compressor.

3.3 – 06CC Series Compressors – Physical Data (page 2 of 2)

CARRIER/ CARLYLE MODEL NUMBER	MOTOR SIZE		DISPLACEMENT At 1750 RPM		DISPLACEMENT At 1750 RPM		NO. OF CYL	BORE		STROKE		OIL CHARGE		NET WEIGHT		BODY SIZE
	HP	kW	CFM	L/M	CFH	L/H (,000)		in.	mm	in.	mm	Pints	Liters	Lb	Kg	
06CC016...(g)	5	3.7	15.9	450	954	27.01	6	2	50.8	1 1/4	31.8	9.5	4.5	330	150	D
06CC018...(g)	5	3.7	18.3	518	1100	31.09	6	2	50.8	1 15/32	37.3	9.5	4.5	325	147	D
06CC124...	6 1/2	4.9	23.9	677	1435	40.60	6	2	50.8	1 1/4	31.8	9.5	4.5	335	152	D
06CC125...	6 1/2	4.9	23.9	677	1435	40.60	6	2	50.8	1 1/4	31.8	9.5	4.5	340	154	D
06CC228...	7 1/2	5.6	28	793	1680	47.57	6	2	50.8	1 15/32	37.3	9.5	4.5	340	154	D
06CC337...	10	7.5	37.1	1050	2225	63.03	6	2	50.8	1 15/16	49.2	9.5	4.5	345	156	D
06CC550...(g)	15	11.2	50.3	1424	3016	85.45	6	2 11/16	68.3	1 63/64	50.4	19	9.0	545	247	E
06CC665...	20	14.9	68.3	1934	4096	116.0	6	2 11/16	68.3	1 63/64	50.4	19	9.0	555	252	E
06CC675...	20	14.9	75.4	2135	4524	128.1	6	2 11/16	68.3	2 3/16	55.6	19	9.0	555	252	E
06CC899...	30	22.4	99.0	2803	5940	168.2	6	2 11/16	68.3	2 7/8	73.0	19	9.0	580	263	E

3.4 — 06D, E High Efficiency (H.E.) Compressors

High efficiency compressors were phased in between 1985 and 1987. A high efficiency compressor can be identified as follows:

All 06D H.E. compressors (new or service replacement) have the number "3" in the 11th digit of the model number. See page 3 for examples.

The 06E compressor model numbers did not change. To determine if a 06E compressor is high efficiency, check the serial number. The following serial numbers indicate high efficiency:

06EA models start with S/N 4585J...
06EM models start with S/N 0786J...
06ER models start with S/N 2287J...

All 06CC compressors are H.E. design.

All service compressors are high efficiency, except for some "D" body units without a "3" in the 11th digit of the model numbers.

NOTE: The 06E H.E. valve plates are identified by an elongated ear protruding from the side of the valve plate, in contrast to the standard efficiency valve plates which have one (A/C - EM, EZ, etc.,) or two (refrigeration - ER, EY) rounded ears.

3.5 — Compressor Bodies Without Oil

In 1995 Carlyle began supplying new and service compressors with no oil in the crankcase due to the introduction of HFC/POE systems. This eliminates the need to drain mineral oil from the crankcase when alkylbenzene or POE oil is to be used. POE oil is very hygroscopic (will readily pick up and retain moisture

from the air) and should be added just prior to system start-up only. See Section 2.2, page 11 for Carlyle approved system start-up instructions and Section 3.6 below for the proper refrigerant oils.

3.6 — Refrigerants and Oils for 06D, E Compressors

The introduction of HFC/POE systems has led to confusion as to what refrigerants and oils are approved for use in Carlyle compressors. For 06CC compressors, see Section 3.7, page 72. The following sections list approved refrigerants and oils for Carlyle 06D, E compressors:

Refer to the following chart for Totaline® Part Numbers for available oils:

OIL	Part No.
	ALKYLBENZENE (AB) OIL
Zerol 150	P903-2001 (1 Gal)
	P903-2005 (5 Gal)
	P903-2025 (1 Quart)
	MINERAL OIL
RO 15	P903-0101 (1 Gal)
	P903-0125 (5 Gal)
	P903-0155 (55 Gal)
	POLYOL-ESTER (POE) OIL
SW 68*	P903-1001 (1 Gal)
	P903-1025 (1 Quart)
	P903-1005 (5 Gal)
	POLYOL-ESTER (POE) OIL
E68	P903-1725 (1 Quart)
	P903-1701 (1 Gal)
	P903-1705 (5 Gal)

* Do not use in low temperature applications.

The following MINERAL/ALKYLBENZINE are approved oils for CFCs and HCFCs:

NOTE: Carlyle does not recommend the use of POE oil with R-22.

Totaline.....P903-2001
Witco.....Suniso 3GS
Shrieve Chemical.....Zerol 150
Texaco Capella.....WFI-32-150
IGI Petroleum Ind.....CRYOL -150

FOR CFCs AND HCFCs:

Carlyle has approved the use of **R-12, R-500, R-502,** and **R-22.** Selected OEMs of ultra low temperature equipment are approved to use R-13 and R-503 (contact Carlyle Engineering for correct oil).

FOR HCFC BLENDS:

Carlyle's engineering efforts were directed toward testing the new HFC refrigerants, not the interim HCFC blends. Carlyle provides tentative approvals of the following blends based on tests by the refrigerant manufacturer and feedback from field applications, not on testing undertaken by Carlyle:

- For Low Temperature applications: **R-402A (HP-80)** and **R408A (FX10)**.
- For Medium Temperature applications: **R-401A (MP-39), R-402B (HP-81)** and **R409A (FX56)**.

NOTE: Carlyle compressors require alkylbenzene oil, such as Totaline® P903-2001or Shrieve Chemical-Zerol 150**,** whenever an HCFC blend is used. In a retrofit application the amount of mineral oil cannot exceed 25% when mixed with alkylbenzene. **Carlyle does not recommend the use of POE lubricants with HCFC blends.**

⚠ WARNING

A number of HCFC blends are not approved. Some may create a hazardous situation. Carlyle requires all refrigerants used in our compressors to be A1/A1 (low flammability/low toxicity). The rating is based on ASHRAE 34 safety standard. Not all A1/A1 refrigerants are approved for use in Carlyle compressors. Some of the refrigerants or blends available are either flammable (A1/A2 or A1/A3) and/or toxic (A1/B1 or A1/B3). Some A1/A1 refrigerants can change ratings if contaminated. Any replacement refrigerant must operate with the same pressure levels and temperature ranges as the CFC or HCFC being replaced. **Do not use any refrigerant not specifically approved in this guide unless you have obtained approval from the Carlyle Compressor engineering department.**

FOR HFCs**:**

Carlyle has approved **R-134a, R404A, R-507, and R-407C.**

The following POLYOL-ESTER (POE) are approved oils for HFCs:

Totaline® (see Note 5).....P903-1001, 1701
Castrol..(see Note 5) E68
ICI Emkerarate RL68H
CPI CP-2916S
CPI ..... Solest 68
BP Marine Enersyn MP-S68

All POE oils are very hygroscopic (will readily pick up and retain moisture from the air) and should be used completely once the container is opened. It is extremely difficult to reseal the oil container effectively enough to prevent moisture absorption, which in turn forms damaging acids.

NOTES:

1. The use of any non-approved refrigerant may be dangerous and will void the warranty.
2. Using the wrong type or weight of oil for the refrigerant selected will void the warranty.
3. Follow the refrigerant and/or oil manufacturer instructions when installing or retrofitting.
4. Contact the Carlyle Compressor engineering department before using any refrigerant or oil not listed in this guide as approved for use in a Carlyle semi-hermetic compressor.
5. Castrol SW68 (Totaline® P903-1001) is approved for use in Carrier chiller applications as well as Carrier and Carlyle semi-hermetic compressors for air conditioning and medium temperature applications. **Castrol SW68 (Totaline® P903-1001) cannot be used in any new low temperature refrigeration applications using Carlyle OEM semi-hermetic compressors. Castrol E68 is approved for use in Carlyle OEM compressors for low, medium, and high temperature ranges.**
6. All HFC/POE applications require a crankcase heater.
7. Moisture must be kept below 50 ppm for POE oils.
8. In retrofit applications, a high flow oil pump is required.

3.7 — Refrigerants and Oils for 06CC Compressors

All 06CC compressors are approved for R-22, R-404A and R-507 except compressors in the 16 to 37 Cfm range. Compressors in this size range cannot be used with R-404A and R-507 prior to Serial No. 2099J ---- without installing a retrofit compressor valveplate (Part No. 06CY660-002) kit. See Section 3.6 on page 69 for further information about refrigerants and oils.

See Section 3.6 on pages 69 & 71 for the correct oil for each refrigerant. Contact Carlyle Engineering for correct oil for R-23 and R-508A (SUVA 95).

3.8 — Oil and Refrigerant Change-Out Procedures

To change from a CFC or HCFC to either an HFC or an HCFC blend, follow the refrigerant and oil manufacturer installation procedures. Select a Carlyle approved refrigerant and appropriate oil as noted in Sections 3.6 and 3.7 above. System cleanliness is extremely important. To ensure a trouble-free change out, Carlyle Engineering has made specific guidelines available. We strongly recommend a copy of our guidelines be requested and procedures carefully followed to avoid problems.

3.9 — Oil Viscosity and Pour Points

The viscosity of oils used in Carlyle reciprocating compressors is ISO 68 (centistoke) for all POE oils and 150 Saybolt Seconds Universal (150 SSU or 150 SUS) or ISO 32 for mineral and alkylbenzene oils. Using oil with a different viscosity without approval from the Carlyle Engineering Department will void the warranty.

The oils listed in Sections 3.6 and 3.7 and the viscosity listed above can be used down to -40°F (-40°C). If your system runs at a lower temperature, please contact Carlyle Engineering for an oil recommendation.

3.10 — Oil Additives

No oil additive is allowed without written approval from the Carlyle Engineering Department. The use of any unauthorized additive will void the warranty.

3.11 — Oil Pressure

All new 06D, E, CC compressors are supplied with oil safety switch connections. Carlyle has introduced a new high flow oil pump and changed oil pressure specifications due to changes in lubricants and refrigerants. The following data notes the proper oil pressure range based on the compressor's date of manufacture:

STARTING MARCH 1994 WITH S/N 1094J AND LATER:

- For new OEM 06D and 06CC (16 to 37 Cfm) compressors, the pressure is 18 to 26 psi (1.2 to 1.8 Bars)
- For new OEM 06E and 06CC (50 to 99 Cfm) compressors, the pressure is 18 to 34 psi (1.2 to 2.3 Bars)
- Note that service compressors did not receive the new pump until serial number starting with S/N 2994M and later.

BETWEEN MAY 1984 AND MARCH 1994 OR BETWEEN S/N 2084J AND 1094J:

- For all 06D, E, CC compressors, the oil pressure is 16 to 22 psi (1.1 to 1.5 Bars)

BEFORE MAY 1984 OR BEFORE S/N 2084J:

- For all 06D/E compressors, the oil pressure is 12 to 18 psi (0.8 to 1.2 Bars)

- For more information about the high flow oil pump, see Section 3.12.

3.12 — High Flow Oil Pump (Bearing Head)

Carlyle introduced a new high flow oil pump to provide improved lubrication with the new HFC refrigerants and POE lubricants. The pump is a durable, automatically reversible, high flow design. The high flow design improves lubrication, especially with the new HFC/POE combination, and provides improved lubrication in the case of a flooded start. This oil pump is standard on all new and service compressors. See Section 3.11 above for details on oil pressure. For service replacement, authorized service locations will have the new high flow oil pump only. See Section 3.13 below.

3.13 — Replacement Oil Pump/Pump End Bearing Package

The oil pump and pump end bearing are an integral part called the pump end bearing head. If either the oil pump or the bearing requires replacement, order part as noted below:

PUMP END BEARING HEAD PACKAGE	USAGE
06DA660126	All 06D, 06CC (16 to 37 Cfm) compressors
06EA660157	All 06E, 06CC (50 to 99 Cfm) compressors

NOTE: The above pump end bearing head packages include a bearing head **with** the high side oil safety switch connection. This pump is recommended for all CFC, HCFC, and HFC refrigeration applications.

3.14 — Oil Safety Switch

Carlyle uses as standard the 120-second time delay oil safety switch, as this time period is preferred for HFC/POE systems. This is a change from the 45 to 60-second time delay used previously with CFC and HCFC systems. It is not necessary to change out the older, shorter time delay switch unless the unit is converted to an HFC/POE system.

The oil safety switch protects the compressor when lubrication is lost for more than 120 seconds. The switch closes the control circuit at start-up allowing the compressor to run for 120 seconds. Operating oil pressure must reach 11 psi above suction pressure within 120 seconds for the switch to remain closed, which allows the compressor to run. If the operating oil pressure falls to 4 psi above suction for longer than 120 seconds, the switch will open the control circuit, shutting down the compressor.

Carlyle has approved the following oil safety switches for all applications with 06D, E, CC compressors:

- Danfoss - Type MP54. See details below
- Penn/Johnson electronic switch - P445

CARLYLE PART NO.	DANFOSS PART NO.	TIME DELAY (SEC)	CONN.	PRESSURE DIFF. (PSI)		VOLTS	RESET	REMOTE ALARM CIRCUIT
				Cut-In	Cutout			
P529-2430	060B2109	120	1/4 Male Flares	8-11	4-8	115/230	Manual	Yes
P529-2410	060B2164	120	36" Long Capacity Tube 1/4" SAE Nuts	8-11	4-8	115/230	Manual	Yes

Use of an oil safety switch is recommended/required by Carlyle as noted in the chart below:

TYPE OF SYSTEM	USING 06D COMPRESSORS	USING 06E COMPRESSORS	USING 06CC COMPRESSORS
Single Compressor without Unloading	Recommended	Required	Required
Single Compressor with Unloading	Recommended	Required	N/A
Multiple Compressors without Unloading	Required	Required	Required
Multiple Compressors with Unloading	Required	Required	N/A

3.15 — 06CC, 06E Discharge Gas Cylinder Head Temperature Sensor & 06E Pressure Relief Valve

All OEM Carlyle 06EA, EM, ER compressors since 1982 are equipped with a discharge gas temperature sensor. The sensor is installed in the discharge or center head on all six-cylinder (three-head) models. The four cylinder 06Es (two heads) have the sensor in the left side head as viewed from the oil pump end. All 06CC compressors have the sensor located in the discharge (high stage) head.

Pressure Relief Valve

All 06E compressors and all 06CC 50-99cfm compressors are equipped with a pressure relief valve that relieves from discharge pressure to crankcase pressure. It is located under the center cylinder head on all 6 cylinder 06E and 06CC compressors, and under the discharge service valve on all 4 cylinder 06E compressors. The relief valve is sealed with a metal gasket:

Part Number	*Description*
EB51FN272	400psi Relief Valve (differential pressure)
6G65-1251	Relief Valve, Gasket

An 11/16" drag link socket can be useful for removing/installing the relief valve.

When the discharge gas temperature in the cylinder head exceeds the sensor trip setting (see below), the sensor will open the control circuit and shut off the compressor. The head sensor must be wired into the control circuit by the OEM and is pilot duty only at 240V = 0.52A, at 115V = 1.04A. The sensors are threaded into the head without a well. Therefore, when changing a sensor, the compressor must first be isolated and evacuated.

CYLINDER HEAD TEMPERATURE SPECIFICATIONS

	Refrigeration from 1982 to mid-1998 for 06ER, EM, EY and EZ	All 06E and 06CC Compressors
Part Number	06EA0512283	HN68GA242
Opens	325° ±8° F (163° ±4° C)	295° ±5° F (146° ±3° C)
Closes	250° ±12° F (121° ±7° C)	235° F minimum (113° C)
Wire Color	Silver Grey	Black
Thread	1/2" NPT	1/2" NPT

NOTES:

1. Since 1993 all Carrier 06 series air conditioning compressors have been made without a sensor. All Carlyle OEM 06 series compressors are equipped with a sensor.

2. Starting in mid-1998 all Carlyle OEM compressors, including 06EA, EM, ER and all 06CC models, are built using the HN68GA242 sensor. The change to a single sensor model is due to the increased use of HFC refrigerants, which operate at lower temperatures.

3.16 — 06D, E Cylinder Head Cooling Fans

Cylinder head cooling fans are recommended on all applications where the saturated suction temperature (SST) is below 0°F (-18°C). A cylinder head cooling fan must be used for all R-22 single stage applications

below 0°F (-18°C) and all R404A/507 single stage applications below -25°F (-32°C). A cylinder head cooling fan is recommended (but not required) for any two-stage (Compound Cooling) applications.

CYLINDER HEAD COOLING FAN REPLACEMENT PARTS

	06D (13-41 Cfm) 06CC (16-37 Cfm)	06E, 06CC (50 to 99 Cfm)
Complete fan package	06DR660014	06ER660011
Replacement motor (208/230-1-60)	HC27GB230	HC27GB230
Replacement blade package	06DR660012	06ER660007
Fan Guard	06DA401763	06EA401293
Cylinder head stud (standard cyl. head)	06DA503213	06EA501973
Cylinder head stud (with unloader cyl. head)	06DA680047 (06D Only)	---
Mounting stud nuts	3/8-16	1/2-13

3.17 — Capacity Control Accessory Packages (Suction Cut-Off Unloading Type)

The following suction cut-off capacity control packages are available to field convert those 06D, 06E compressors without unloading. With the exception of the 06D 2-cylinder models, these packages can be added to any new, replacement, or existing 06D or 06E compressors. See Fig.16.

NOTE: Before adding a suction cut-off control package to a compressor currently without unloading, consider all line piping sizes and design to ensure proper oil return to compressor with reduced (unloaded) refrigerant flow rates.

CAPACITY CONTROL PACKAGES

COMPRESSOR	TYPE	PACKAGE NUMBER	BARE UNLOADER VALVE
06D	Electric	06DA660089*	06EA660135
06D	Pressure	06DA660090	06EA660100†
06E	Electric	06EA660138*	06EA660135
06E	Pressure	06EA660139	06EA660100†

* Coil NOT included, order separately (see Section 3.18).

† Special Allen head wrench to change valve is part number 06EA680036.

NOTES:

1. Each package unloads 2 cylinders (1-step) and includes (1) cylinder head assembly with applicable unloader valve (electric or pressure) and necessary gaskets.
2. When adding the suction cut-off unloading feature to any compressor, it is no longer necessary to change the valve plate. The suction cut-off method of unloading functions independently of the valve plate.
3. To avoid interfering with hi-lo pressure connections or cylinder head sensor, install the unloader cylinder head as follows (viewed from P.E. of compressor):
   - 06D 4-cyl - left hand cylinder deck
   - 06E 4-cyl - right hand cylinder deck
   - 06D, 06E 6-cyl - either cylinder deck (both when applicable)
4. Unloader valve gasket part number 06EA501253.
5. Unloader is not available for 06CC compressors.

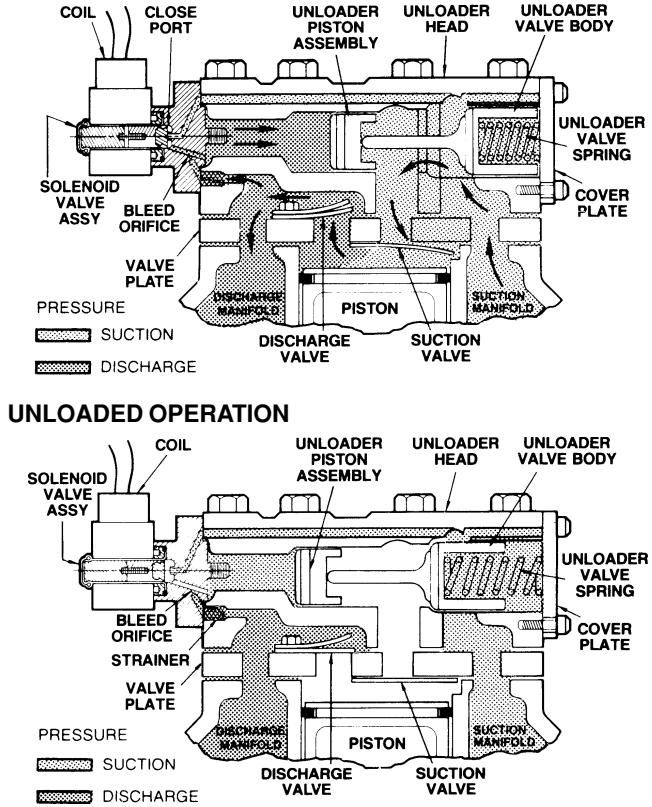


Fig. 16— Loaded and Unloaded Operation

3.18 — Capacity Control Coil Packages (06D, E)

COIL PACKAGE PART NUMBER	VOLTAGE	ALCO P/N (REF)
EF19ZE120 (06DA402784)	120-1-50/60	X13904-C7245
EF19ZE240 (06DA401794)	208/240-1-50/60	X13904-C7045
EF19ZE024 (06DA401844)	24-1-50/60	X13904-C7145

3.19 — Crankcase Heater Data

Crankcase heaters help reduce refrigerant migration to the compressor during shut-down. Crankcase heaters are designed to raise the temperature in the compressor oil compartment approximately 15 to 25°F (8 to 14°C). Carlyle recommends crankcase heaters be wired so the heater is energized only when the compressor shuts off. Crankcase heaters should be "ON" initially for 24 hours before starting the compressor. All HFC/POE applications require a crankcase heater.

STRAP-ON HEATERS:

Mounted externally to the underside of the stamp steel bottom plate. Install axially using (2) bottom plate bolts plus brackets and screws in package. Used on 06D( )808, 109, 013, 313, and 316 compressors. All strap-on heaters are 50 watts.

INSERTION HEATERS:

Insert into cast well (hole) in cast iron bottom plate. Circular clip with barbs secures heater. Used on 06D( )718, 818, and 820 4-cylinder compressors, all 6-cylinder 06D compressors, all 06E and all 06CC compressors. Insertion heaters are available in 125 and 180 watt sizes.

CRANKCASE HEATER PACKAGES

CRANKCASE HEATER PACKAGE	TYPE	HEATER NUMBER	VOLTAGE	WATTS	CONDUIT in. (cm)	WIRE LENGTH in. (cm)
06DA660091	Strap-on	HT33AK300	115	50	24 (61)	39 (99)
06DA660092	Strap-on	HT33BK310	230	50	24 (61)	39 (99)
06EA660165	Insertion	HT36DM132	115	180	19 (48)	24 (61)
06EA660167	Insertion	HT36DM134	115	180	52 (132)	73 (185)
06EA660166	Insertion	HT36DM432	230	180	19 (48)	24 (61)
06EA660168	Insertion	HT36DM434	230	180	52 (132)	73 (185)
06DA660076	Insertion	HT36DL480	480	125	-	24 (61)

NOTES:
1. Insertion heaters use AS8IVF056 tubular clip.
2. Thermal grease is provided and must be used with 180 watt heaters (grease packet P/N 38AQ680001).

3.20 — Compressor Mounting Data

Mounting packages are available to mount individual compressors. Package contains mounting springs, threaded studs, snubbers, spring cups, nuts, and washers for (1) compressor.

MOUNTING PACKAGE NUMBER	USE WITH BODY STYLE
06DA660058	06D 2-cyl
06DA660056	06D 4-cyl
06DA660057	06D, 06CC (16 to 41 Cfm) 6-cyl
06EA660089	06E 4 and 6-cyl and 06CC (50 to 99 Cfm)

COMPRESSOR MOUNTING PLATE PACKAGE
No. 06EA660096

This universal mounting plate will accommodate any size 06D, 06E, and 06CC compressor. Mount plate to existing base and mount the Carlyle compressor to the plate. Package includes pre-drilled mounting plate, spacers, and template.

3.21 — Compressor Service Valves (06D, E, CC)

VALVE PACKAGE NO.*	SENSOR VALVE PACKAGE* INCLUDES 12mm SAE FITTING FOR TRANSDUCER	ODS (in.)	BOLT HOLE SPACING (in.)	VALVE NUMBER
06DA660060	06EA900412	5/8 BRASS	1-5/8	EN32AA250
06DA660061	06EA900422	7/8 BRASS	1-5/8	EN07AA271
06DA660062	06EA900432	7/8 BRASS	1-3/4	EN07AA284
06DA660063	06EA900442	1-1/8 BRASS	2-1/2 sq.	EN07EA033
06DA660064	06EA900452	1-1/8 BRASS	1-3/4	EN07AA348
06DA660065	06EA900462	1-3/8 BRASS	2-1/2 sq.	EN07EA039
06EA660090	06EA900472	1-5/8 BRASS	2-1/2 sq.	EN07EA041
06EA660091	-	2-1/8 BRASS	3-1/16 sq.	EM13FA516
06DA660164	06EA900482	2-1/8 STEEL	3-1/16 sq.	EN07EA510

* Valve packages consist of (1) service shut-off valve and required gasket and mounting bolts.
NOTE: Sensor Valve Packages required with Carlyle Sentinel module.

3.22 — Service Valve Gaskets (06D, E, CC)

DESCRIPTION	FIBER VALVE GASKET PACKAGE*	METAL VALVE GASKET PACKAGE
2-bolt 1-5/8" spacing	6D23-1421	06DA504143
2-bolt 1-3/4" spacing	6D40-1131	06DA504163
4-bolt 2-1/2" square	6D68-1131	06DA504153
Circular, No Holes	6G65-1061	-

* Service package contains 12 gaskets.

3.23 — Oil Drain Plug Adapter

All new compressors, except for 06D( )808, 109, 013, 313, and 316 models, are built with a 7/16-20 SAE fitting and O-ring as the oil drain plug. Carlyle offers an oil drain adapter, P/N DE14CA126, which replaces the SAE plug. This adapter allows the installation of a 1/4in. NPT angle valve as a drain fitting.

3.24 — Sight Glass Adapters for Oil Equalization

ADAPTER PACKAGE	COMPRESSOR USAGE
P/N: 06DA900072 P/N: 06EA660127	For all 06D and 06CC (16 to 37 Cfm) For 06E and 06CC (50 to 99 Cfm)

3.25 — Replacement Sight Glass/Installation Tool

SIGHT GLASS PACKAGE/INSTALLATION TOOL	COMPRESSOR USAGE
5F20-152 Sight Glass (S.G.)	All 06Ds and 06CC (16 to 37 Cfm)
06EA402403 (S.G. without O-ring)	All 06Es and 06CC (50 to 99 Cfm)
KK71GW015 (O-ring for S.G.)	All 06Es and 06CC (50 to 99 Cfm)
T133300B-1 (Installation Tool)	All 06Ds and 06CC (16 to 37 Cfm)

* 5F20-152 sight glass assembly includes 5F20-1631 gasket.

3.26 — Replacement Motor End Mounting Foot

MOTOR END FOOT P/N	COMPRESSOR USAGE	MOUNTING HOLE WIDTH (IN.)
6D40-1042	All 2 cylinder 06D All 4 cyl. 13 & 16 CFM 06D All 6 cyl. 06DA A/C duty models	8.875
6D48-2063	All 4 cyl. 18 & 20 CFM 06D	8.25
06EA500052	All 6 cyl. 06DR & DM & 06CC (16 to 37 CFM "D" Body) All 06EA A/C duty models	8.875 & 11.375
06EA501172	06CC (50 to 99 CFM "E" Body) & All 06ER/EM Refrig. duty models	8.875 & 11.375

3.27 — Gaskets – Cylinder Head and Valve Plate

GASKET TYPE	PART NUMBER
06D COMPRESSORS	
1: Cylinder head gaskets	
a. Side bank, no unloading	05GA502213
b. Side bank, with unloading (suction cut-off design)	05GA502223
c. Side bank, with unloading (hot gas bypass design)	05GA502183
d. Center bank	05GA502173
2: Valve plate gaskets	
a. Standard 2" diameter cylinder bore	05DA500153
b. Old design 1-13/16" diameter cylinder bore	6D40-1073
c. Blank-off (special) used only on old standard 16 Cfm models with suction valve at P.E. and using H.E. valve plates	06DA502923
06E COMPRESSORS	
1. Cylinder head gaskets	
a. Side bank, no unloading	06EA503304
b. Side bank, with unloading (Suction cut-off design)	06EA503334
c. Side bank, with unloading (hot gas bypass design)	06EA503314
d. Center bank (standard or reversed)	06EA503314
2. Valve plate gaskets	
a. H.E., low temperature (ER, EY) .028"/.036"	Package #06ER660012 contains (1)06EA504884 gasket/ (2)suction valves
b. H.E., medium temperature (EM, EZ) .067"/.072"	06EA504884 (fiber) or 06EA506414 (metal)
c. H.E., high temperature (EA, ET) .067"/.072"	06EA504884 (fiber) or 06EA506414 (metal)
d. Old standard, low temperature (ER, EY) .035"/.041"	06ER660012
e. Old standard, medium temperature (EM, EZ) .035"/.041"	06ER660012
f. Old standard, high temperature (EA, EX) .067"/.072"	06EA504884
06CC COMPRESSORS	
16 to 37 Cfm	
a. Cylinder head	05GA502213
b. Valve plate	06DA500153
c. Suction manifold	6D40-1131*
d. Interstage manifold	5D40-1131*
e. Liquid injection	6D23-1421*
f. Interstage tube	6D23-1421*
50 to 99 Cfm	
a. Cylinder head	06EA503304
b. Valve plate	06EA504884
c. Suction manifold	6D68-1131*
d. Interstage manifold	6D68-1131*
e. Liquid injection	6D23-1421*
f. Interstage tube	6D68-1131*

* Service package contains 12 gaskets.

NOTE: "H.E." and "Old Standard" are designations based on date of manufacture; see Section 3.4 p.68 for details.

3.28 — Miscellaneous

Terminal Plate Gasket

COMPRESSOR USAGE	PART NUMBER
All 06D, 06CC (16 TO 37 CFM) 06E, 06CC (50 TO 99 CFM)	6D40-1061 6G45-1082

Sensor Block Gasket (Used between transducer sensor block and bearing head with Johnson P445 (06DA660115) oil safety switch)

COMPRESSOR USAGE	PART NUMBER
06D, 06E, 06CC	06DA680063

Electrical Terminal Barrel Nut Tool (Socket tool used for installation of terminal nuts)

COMPRESSOR USAGE	PART NUMBER
All 06D, 06CC (16 TO 37 cfm)	P920-0009

3.29 — Valve Plate Packages, Service Replacement

Carlyle began installing high efficiency valve plates in the mid 1980's. With a few exceptions noted, the valve plates fit all current and older Carlyle compressors. Check notes below the table for exceptions.

COMPRESSOR USAGE	VALVE PLATE PACKAGE
06D, 06CC (16 to 41 Cfm) Compressors	
a. 06DR (if using 06DR013, 06DM313, 06DR316, or 06DM316 models see note 2)	06DA660094
b. 06DM, DA (if using 06DR013, 06DM313 06DR316, or 06DM316 models see note 2)	06DA660120
c. 06CC (16 to 37 Cfm) low stage valve package	06CY660002
d. 06CC (16 to 37 Cfm) high stage valve package	06DA660120
06E, 06CC (50 to 99 Cfm) Compressors	
a. 06ER	06EA660143
b. 06EM, EA	06EA660137
c. 06CC (50 to 99 Cfm) low stage valve*	06EA660159
d. 06CC (50 to 99 Cfm) high stage valve	06EA660137

* Includes relief valve for both low stage banks.

NOTES:

1. Carlyle recommends the 06ER660017 service replacement valve plate kit for all 06ER compressors in low temperature environmental chamber applications (see Note 6).
2. All high efficiency (units with a "3" in the 11th digit of the model number) 06DR013 and 06DM313, 06DR316, and 06DM316 models have a 2" diameter cylinder bore and use the above valve plate kits. Older 13 and 16 cfm (prior to 1985) models have a 1-13/16" diameter bore and cannot use these valve plate kits. Kits for these models are no longer available. Suction reed valve (part no. 6D45-1072) and discharge reed valve (part no. 6D75-1062) can be used for valve plate field repair.
3. Hot gas bypass unloading requires a special valve plate kit with gaskets as follows:

   06D.. .....06DA660131
   06E 06EA660105

   The Carlyle recommended suction cut-off unloading does not require a special valve plate. Suction cutoff unloading uses the standard high efficiency valve plate kit, which includes the needed gasket.

4. Service valve plate kits include:
   (1) valve plate assembly, (2) suction reed valves, (3) cylinder head gaskets (side, center and suction gas unloading), (1) valve plate gasket; and for 06D compressors there are (2) suction valve position springs.
5. All new high efficiency 06DM, 06DA, and 06CC (16 to 37 Cfm) compressors have flat top pistons. All new high efficiency 06DR and 06ER compressors have one step contoured pistons. All new high efficiency 06EM, 06EA, and 06CC (50 to 99 Cfm) compressors have two-step contoured pistons.
6. The outer edges of the valve plates have "ears" that are visible when installed on the compressor. All new high efficiency valve plates have one elongated "ear" versus one or two rounded "ears" on the older standard efficiency valve plates. Note the valve plate supplied in package 06ER660017 for environmental chambers has two rounded ears.

3.30 — Muffler Recommendations

Mufflers can reduce discharge gas pulsation and effectively eliminate vibration problems downstream. They should be placed as close to the compressor as possible to maximize efficiency and minimize vibration. Mufflers should be:

- used on all 06E 66 and 99 Cfm compressor models.
- used on all 06E compressors with capacity control.
- considered for use with all 06D 37 and 41 Cfm compressor models.
- considered for use with all 06D 6-cylinder compressors with capacity control

MUFFLER	WEIGHT LB (KG)	INLET/OUTLET (in.)	COMPRESSOR SIZED BY CFM
06DA605594	5 (2.3)	5/8 ODM	08, 09, 13, 16
06DA605604	5 (2.3)	7/8 ODF	18, 20, 24
06DA605614	5 (2.3)	1-1/8 ODF	28, 37, 41
06EA500302	10 (4.5)	1-3/8 ODF	50
LM10HH100	6 (2.7)	1-3/8 ODF	65, 75 and 06E( )399
06EA500712	7 (3.2)	1-7/8 ODF	06E( )499, 599 and 06CC899

Mufflers can be mounted horizontally or vertically.

3.31 — Electrical Accessories

BOX PACKAGE - This consists of terminal box, cover, and necessary mounting components.

TERMINAL BOX PACKAGE NUMBER	TYPE	COMPRESSOR USAGE AND SIZE
06DA660078	Drawn Steel	All 06D 2-cyl. (6" x 5-3/4") (15.2cm x 14.6cm)
06DA660075	Fabricated	All 06D 4-cyl. (6" x 5") (15.2cm x 12.7cm)
06DA660088	Fabricated	All 06D 6-cyl. and 06CC 16 to 37 Cfm (6" x 8") (15.2cm x 20.3cm)
06EA660095	Drawn Steel	All 06E 4- and 6-cyl. compressors and 06CC 50 to 99 Cfm (7" x7") (17.8cm x 17.8cm)

TERMINAL LUG PACKAGE - This consists of 6 screw-on terminal lugs with set screws. Strip power wire 1/2 in., insert into terminal lugs, and secure in place with set screw.

TERMINAL LUG PACKAGE NUMBER	COMPRESSOR USAGE
06EA660095	All 06D and 06CC 16 to 41 Cfm
HY85TB008	All 06E and 06CC 50 to 99 Cfm #4 to #8 Wire Size
HY85TB004	All 06D and 06CC 50 to 99 Cfm #1 to #4 Wire Size

TERMINAL PLATE JUMPER PACKAGE FOR 06E, 06CC 50 TO 99 Cfm - This package consists of jumper bars, terminal nuts and instructions to interconnect terminal studs for proper motor starting (P/W or X/L) and voltage.

JUMPER PACKAGE NUMBER	USAGE
06EA660141	208/230/460 (triple voltage)
06EA660097	208/230/460/575 (distinct voltage)

NOTE: With 06E multi-volt (208/230/460) compressors, the 460-volt motor can be connected only for across-the-line start. A compressor with a distinct 460-volt motor (or designated P/W) must be used for part-winding start.

3.32 — Baffle Plate Recommendations

Baffle plates can be used to reduce compressor discharge gas pulsations. Recommended baffle plate assemblies are shown below. These plates are designed to create a 6 to 10 psi (0.4 to 0.7 Bars) pressure drop in the discharge gas. Use only the baffle plate recommended for the application. These baffle plates, sandwiched between two gaskets, are installed between the compressor discharge service valve and the compressor crankcase or cylinder head. For further details, see Carlyle OEM Bulletins No. 118 and 119.

COMPRESSOR	APPLICATION	BAFFLE PLATE PART NUMBER*
06D-13, 16, and 20 Cfm	low and medium temperature	06DA660103
06D-24, 25, 28, 37 and 41 Cfm	low temperature only †	06DA660104
06D-24, 25, 28, 37 Cfm and all 06CC 16 to 37 Cfm	medium temperature & 06CC	06DA660105
06E-50 Cfm	low and medium temperature	06DA660105
06E-65, 75, 99 Cfm and all 06CC 50 to 99 Cfm	low and medium temperature	06EA660145

* Includes baffle plate and 2 gaskets.
† For single-stage application. When using as booster application, use medium temperature baffle plate.

3.33 — Interstage Pressure Tables (06CC Compressors Only)

All 06CC compressors are a two-stage design. Therefore, the pressure measurements are suction, interstage, and discharge. The following tables list the interstage pressures using R-22 and R-404A/507 refrigerants.

R-22 APPROXIMATE INTERSTAGE PRESSURE ± 10psi (.7 BAR) WITH SUBCOOLER

Saturated Suction Temp, F (C)	Suction Pressure PSIG (BAR)	Saturated Condensing Temperature, F (C)							
		60 (16)	70 (21)	80 (27)	90 (32)	100 (38)	110 (43)	120 (49)	130 (54)
		Condensing Pressure, PSIG (BAR)							
		101.6 (8.02)	121.4 (9.39)	143.6 (10.92)	168.4 (12.63)	195.9 (14.52)	226.4 (16.63)	259.9 (18.94)	296.8 (21.48)
-60 (-51)	11.9 *(0.611)	17 (2.19)	20 (2.39)	23 (2.60)	26 (2.81)	28 (2.94)	31 (3.15)	35 (3.43)	38 (3.63)
-55 (-48)	9.2 *(0.702)	20 (2.39)	23 (2.60)	25 (2.73)	29 (3.01)	32 (3.22)	35 (3.42)	38 (3.63)	42 (3.91)
-50 (-45)	6.1 *(0.807)	22 (2.53)	25 (2.73)	28 (2.94)	32 (3.22)	35 (3.42)	38 (3.63)	42 (3.91)	46 (4.19)
-45 (-43)	2.7 *(0.922)	25 (2.73)	28 (2.94)	31 (3.15)	35 (3.42)	38 (3.63)	42 (3.91)	46 (4.19)	50 (4.46)
-40 (-40)	0.5 (1.05)	27 (2.88)	31 (3.15)	34 (3.36)	38 (3.63)	42 (3.91)	46 (4.19)	50 (4.46)	54 (4.73)
-35 (-37)	2.6 (1.19)	30 (3.08)	34 (3.36)	38 (3.63)	42 (3.91)	46 (4.19)	50 (4.46)	54 (4.73)	59 (5.08)
-30 (-34)	4.9 (1.35)	33 (3.29)	37 (3.57)	41 (3.84)	45 (4.12)	50 (4.46)	54 (4.73)	59 (5.08)	63 (5.36)
-25 (-32)	7.4 (1.52)	36 (3.50)	40 (3.77)	44 (4.05)	49 (4.39)	54 (4.73)	58 (5.01)	63 (5.36)	68 (5.70)
-20 (-29)	10.1 (1.71)	39 (3.70)	43 (3.98)	48 (4.32)	53 (4.67)	58 (5.01)	63 (5.36)	68 (5.70)	73 (6.05)
-15 (-26)	13.2 (1.92)	42 (3.91)	47 (4.26)	52 (4.60)	57 (4.94)	62 (5.29)	67 (5.63)	73 (6.05)	79 (6.46)
-10 (-23)	16.5 (2.15)	46 (4.19)	50 (4.46)	56 (4.88)	61 (5.22)	66 (5.57)	72 (5.98)	78 (6.39)	84 (6.81)

* Indicates Vacuum.

NOTE: 1 BAR = 100 kPa or 1 ATM (Atmosphere) Pressure

R404A/R507 APPROXIMATE INTERSTAGE PRESSURE ± 10 psi (.7 BAR) WITH SUBCOOLER

Saturated Suction Temp, F (C)	Suction Pressure PSIG (BAR)	Saturated Condensing Temperature, F (C)						
		60 (16)	70 (21)	80 (27)	90 (32)	100 (38)	110 (43)	120 (49)
		Condensing Pressure, PSIG (BAR)						
		129.7 (9.96)	153.6 (11.61)	180.3 (13.45)	210.2 (15.51)	243.5 (17.81)	280.6 (20.37)	321.9 (23.21)
-60 (-51)	5.9 *(0.814)	26 (2.81)	30 (3.08)	33 (3.29)	37 (3.57)	40 (3.77)	44 (4.05)	48 (4.32)
-55 (-48)	2.3 *(0.929)	29 (3.01)	33 (3.29)	37 (3.57)	40 (3.77)	44 (4.05)	48 (4.32)	53 (4.67)
-50 (-45)	0.9 (1.08)	33 (3.29)	37 (3.57)	40 (3.77)	45 (4.19)	49 (4.39)	53 (4.67)	58 (5.01)
-45 (-43)	3.1 (1.23)	35 (3.43)	39 (3.70)	44 (4.05)	48 (4.32)	53 (4.67)	57 (4.94)	62 (5.29)
-40 (-40)	5.5 (1.39)	39 (3.70)	44 (4.05)	48 (4.32)	53 (4.67)	58 (5.01)	63 (5.36)	68 (5.70)
-35 (-37)	8.2 (1.58)	43 (3.98)	47 (4.26)	52 (4.60)	57 (4.94)	62 (5.29)	68 (5.70)	73 (6.05)
-30 (-34)	11.1 (1.78)	46 (4.19)	51 (4.53)	56 (4.88)	61 (5.22)	67 (5.63)	73 (6.05)	78 (6.39)
-25 (-32)	14.3 (2.00)	50 (4.46)	55 (4.81)	60 (5.15)	66 (5.57)	72 (5.98)	78 (6.39)	84 (6.81)
-20 (-29)	17.8 (2.24)	54 (4.74)	59 (5.08)	65 (5.50)	71 (5.91)	77 (6.32)	83 (6.74)	90 (7.22)
-15 (-26)	21.7 (2.51)	58 (5.01)	64 (5.43)	70 (5.84)	76 (6.26)	82 (6.67)	89 (7.15)	96 (7.63)
-10 (-23)	25.8 (2.79)	62 (5.29)	68 (5.70)	74 (6.12)	81 (6.60)	88 (7.08)	95 (7.57)	102 (8.05)

* Indicates Vacuum.

NOTE: 1 BAR = 100 kPa or 1 ATM (Atmosphere) Pressure

4.0 — ELECTRICAL DATA

4.1 — 06DR 3 Phase Electrical Specifications

NEW HIGH EFFICIENCY MODELS								OLD STANDARD EFFICIENCY MODELS				
Compressor Model*	Electrical Data					Max kW	HP	Compressor Model*	Electrical Data			
	Volt	MCC	RLA	LRA	Motor Winding Resistance (Ohms)				Volt	MCC	RLA	LRA
06DR1090GA3150	575	4.4	2.8	21.3	7.0	3.1	2	06DR1090GC2100	575	3.9	-	21.3
GA3250	208/230	12.1	7.6	53.3	1.1			GA1200	208/230	12.1	8.6	53.3
GA3650	460	5.5	3.5	26.3	4.4			GA2600	460	5.5	3.9	26.3
06DR0130CA3150	575	7	4.5	28.4	5.0	4.3	3	06DR0130FA0100	575	5.9	4.2	23
CA3250	208/230	17.4	11.2	71	0.81			FA0400	200	17	12.1	63.5
CA3250	208/230	17.4	11.2	71	0.81			FA0500	230	14.8	10.6	57.5
CA3650	460	8.7	5.6	35.5	3.2			FA0600	460	7.4	5.3	28.8
06DR3160CA3150	575	10.8	6.9	40	3.3	6.25	5	06DR3160FA0110	575	9.4	6.7	34.5
CA3250	208/230	27	17.3	100	0.54			FA0410	200	27	19.3	95
CA3250	208/230	27	17.3	100	0.54			FA0510	230	23.5	16.8	86
CA3600	460	13.5	8.6	50	2.1			FA0610	460	11.8	8.4	43
06DR7180DA3150	575	10.8	6.9	40	3.3	6.25	5	06DR7180DA0110	575	9.4	6.7	34.5
DA3250	208/230	27	17.3	100	0.54			DA0410	200	27	19.3	95
DA3250	208/230	27	17.3	100	0.54			DA0510	230	23.5	16.8	86
DA3650	460	13.5	8.6	50	2.1			DA0610	460	11.8	8.4	43
06DR8200DA3150	575	17.6	11.3	64	2.6	9.8	6.5	06DR8200DA0100	575	17.6	12.6	50
DA3250	208/230	44	28.2	160	0.42			DA1200	208/230	48.8	34.9	137
DA3650	460	22	14.1	80	1.7			DA0600	460	22	15.7	62

NEW HIGH EFFICIENCY MODELS								OLD STANDARD EFFICIENCY MODELS				
Compressor Model*	Electrical Data					MAX kW	HP	Compressor Model*	Electrical Data			
	Volt	MCC	RLA	LRA	Motor Winding Resistance (Ohms)				Volt	MCC	RLA	LRA
06DR7240DA3150	575	17.6	11.3	64	2.6			06DR7240DA0100	575	17.6	12.6	50
DA3250	208/230	44	28.2	160	0.42	9.8	6.5	DA1200	208/230	48.8	34.9	137
DA3650	460	22	14.1	80	1.7			DA0600	460	22	15.7	62
06DR7250DA3150	575	17.6	11.3	64	2.6			06DR7240DA0100	575	17.6	12.6	50
DA3250	208/230	44	28.2	160	0.42	9.8	6.5	DA1200	208/230	48.8	34.9	137
DA3650	460	22	14.1	80	1.7			DA0600	460	22	15.7	62
06DR2280DA3150	575	22.2	14.2	79	2.0			06DR2280DA0100	575	22.2	15.9	62
DA3250	208/230	55.5	35.6	198	0.31	12.8	8	DA1200	208/230	55.5	43.9	170
DA3650	460	27.8	17.8	99	1.3			DA0600	460	27.8	19.9	77
06DR3370DA3150	575	25	16.0	91	1.7			06DR3370DA0100	575	25	17.9	69
DA3250	208/230	62	39.7	228	0.26	16.5	10	DA1200	208/230	69	49.3	191
DA3650	460	31	19.9	114	1.0			DA0600	460	31	22.1	86
06DR5410DA0150	575	32	20.5	96	1.2			Not Applicable				
DA1250	208/230	89	57.1	266	0.18	20.7	15					
DA0650	460	40	25.6	120	0.72							

LEGEND
LRA - Locked Rotor Amps
MCC - Maxmium Continuous Current
RLA - Rated Load Amps
* The last two digits of the compressor model number may vary. See page 3.

ALLOWABLE OPERATING RANGES

NOMINAL VOLTAGE	MAXIMUM	MINIMUM
208/230	254	187
460	529	414
575	661	518
400 (50 Hz)	460	342
200 (50 Hz)	230	180

NOTES:
1. RLA (rated load amps) value shown for new high efficiency models is MCC ÷ 1.56 = RLA. Use this recommended (and minimum) RLA value to determine nameplate stamping, minimum contactor sizing and wire sizing.
2. Compressor operating amps at any specific conditions can only be determined from a performance curve.
3. RLA values for 06D compressor protected by a calibrated circuit breaker will depend on must-trip value of circuit breaker.
4. Ohm values shown for resistance are approximate and shown for reference only. Motors from different vendors and motors of different efficiencies can differ up to 15% from data shown.

4.2 — 06DM, DA 3 Phase Electrical Specifications

NEW HIGH EFFICIENCY MODELS								OLD STANDARD EFFICIENCY MODELS				
Compressor Model*	Electrical Data					MAX kW	HP	Compressor Model*	Electrical Data			
	Volt	MCC	RLA	LRA	Motor Winding Resistance (Ohms)				Volt	MCC	RLA	LRA
06DM												
06DM8080GA3150	575	7	4.5	28.4	5.0	4.1	3	06DM8080GC0120	575	5.9	-	23
GA3250	208/230	17.4	11.2	71	0.78			GC0430	200	17.0	12.1	63.5
GA3250	208/230	17.4	11.2	71	0.78			GA0520	230	14.8	10.6	57.5
GA3650	460	8.7	5.6	35.5	3.1			GA0620	460	7.4	5.3	28.8
06DM3130CA3150	575	10.8	6.9	40	3.3	6.25	5	06DM8080FA0120	575	9.4	6.7	34.5
CA3250	208/230	27	17.3	100	0.5			FA0420	200	27.0	19.3	95
CA3250	208/230	27	17.3	100	0.5			FA0520	230	23.5	16.8	86
CA3600	460	13.5	8.6	50	2.1			FA0620	460	11.8	8.4	43
06DM3160CA3150	575	10.8	6.9	40	3.3	6.25	5	06DM3160FA0120	575	9.4	6.7	34.5
CA3250	208/230	27	17.3	100	0.5			FA0420	200	27.0	19.3	95
CA3250	208/230	27	17.3	100	0.5			FA0520	230	23.5	16.8	86
CA3650	460	13.5	8.6	50	2.1			FA0620	460	11.8	8.4	43
06DM3370DA3150	575	25	16.0	91	1.7	16.5	10	06DM3370DA0120	575	25	17.9	69
DA3250	208/230	62	39.7	228	0.26			DA1220	208/230	69	49.3	191
DA3650	460	31	19.9	114	1.0			DA0620	460	31	22.1	86
06DA												
06DA8182AA3150	575	17.6	11.3	64	2.6	9.18	6.5	06DA8182AA0100	575	17.6	12.6	50
AA3250	208/230	44	28.2	160	0.42			AA1200	208/230	48.8	34.9	137
AA3650	460	22	14.1	80	1.7			AA0600	460	22	15.7	62

NEW HIGH EFFICIENCY MODELS								OLD STANDARD EFFICIENCY MODELS				
Compressor Model*	Electrical Data					MAX kW	HP	Compressor Model*	Electrical Data			
	Volt	MCC	RLA	LRA	Motor Winding Resistance (Ohms)				Volt	MCC	RLA	LRA
06DA continued												
06DA8242BA3150	575	22.2	14.2	79	2.0	12.8	8	06DA8242BA0100	575	22.2	15.9	62
BA3250	208/230	55.5	35.5	198	0.31			BA1200	208/230	61.5	43.9	170
BA3650	460	27.8	17.8	99	1.3			BA0600	460	27.8	19.9	77
06DA8252BA3150	575	22.2	14.2	79	2.0	12.8	8	06DA8252BA0100	575	22.2	15.9	62
BA3250	208/230	55.5	35.5	198	0.31			BA1200	208/230	61.5	43.9	170
BA3650	460	27.8	17.8	99	1.3			BA0600	460	27.8	19.9	77
06DA3282BA3150	575-3-60	25	16.0	91	1.7	16.5	10	06DA3282BA0100	575	25	17.9	69
BA3250	208/230	62	39.7	228	0.26			BA1200	208/230	69	49.3	191
BA3650	460	31	19.9	114	1.0			BA0600	460	31	22.1	86
06DA5372BA0150	575	32	20.5	96	1.2	20.7	15	06DA5372BA0100	575	32	22.9	96
BA1250	208/230	89	57.1	266	0.18			BA1200	208/230	89	63.6	266
BA0650	460	40	25.6	120	0.72			BA0600	460	40	28.6	120

LEGEND
LRA - Locked Rotor Amps
MCC - Maxmium Continuous Current
RLA - Rated Load Amps
* The last two digits of the compressor model number may vary. See page 3.

ALLOWABLE OPERATING RANGES

NOMINAL VOLTAGE	MAXIMUM	MINIMUM
208/230	254	187
460	529	414
575	661	518
400 (50 Hz)	460	342
200 (50 Hz)	230	180

NOTES:
1. RLA (rated load amps) value shown for new high efficiency models is MCC ÷ 1.56 = RLA. Use this recommended (and minimum) RLA value to determine nameplate stamping, minimum contactor sizing and wire sizing.
2. Compressor operating amps at any specific conditions can only be determined from a performance curve.
3. RLA values for 06D compressor protected by a calibrated circuit breaker will depend on must-trip value of circuit breaker.
4. Ohm values shown for resistance are approximate and shown for reference only. Motors from different vendors and motors of different efficiencies can differ up to 15% from data shown.

4.3 — 06DR, DM Single Phase Electrical Specifications

COMPRESSOR VARIABLE	COMPRESSOR MODEL				
	06DM8080CA3350*	**06DR1090CA3350***	**06DR0130CA3350***	**06DM3130CA3350* 06DR3160CA3350***	**06DR7180DA3350***
Nominal Horsepower	3	3	3	5	5
Start Capacitor and P/N	196 MFD @ 320 V P281-1896	196 MFD @ 320 V P281-1896	238 MFD @ 320 V P281-2166	238 MFD @ 320 V P281-2166	238 MFD @ 320 V P281-2166
Run Capacitor and P/N	35 MFD @ 440 V P291-3504	35 MFD @ 440 V P291-3504	40 MFD @ 440 V P291-4004	50 MFD @ 440 V P291-5004	50 MFD @ 440 V P291-5004
Start Relay Data Hot Pick-Up Voltage and P/N	220-24 V HN61KB021 or P283-9913	220-240 V HN61KB021 or P283-9913	260-280 V HN61KB022 or P283-9918	350-370 V P283-9912	350-370 V P283-9912
Cold Pick-Up Voltage	208/239 V	208-239 V	239-270 V	328-356 V	328-356 V
Dropout Voltage	50-110 V	50-110 V	50-110 V	60-121 V	60-121 V
Coil Voltage	375 V	375 V	375 V	420 V	420 V
MCC	28	24	32.6	40	40
RLA	20	17.1	23.3	28.6	28.6
LRA	110	110	100	150	150

COMPRESSOR VARIABLE	COMPRESSOR MODEL				
	06DM8080CA3350*	06DR1090CA3350*	06DR0130CA3350*	06DM3130CA3350* 06DR3160CA3350*	06DR7180DA3350*
(T.I. No.) Common Overload	(8347A23-63) HN69GZ024	(8347A23-31) HN69GZ025	(8347A23-63) HN69GZ024	(8348A19-4) HN69GZ307	(8347A19-4) HN69GZ307
(T.I.) Start Overload	(8347A23-53) HN69GZ014	(8347A23-42) HN69GZ032	(8347A23-53) HN69GZ014	(8347A23-40) HN69GZ037	(8347A23-40) HN69GZ037

*The last two digits of the compressor model number may vary. See page 3.

ALLOWABLE OPERATING RANGE

NOMINAL VOLTAGE	MAXIMUM	MINIMUM
208/230-1-60	254 V	187 V

4.4 — 06ER, EY 3 Phase Electrical Specifications

COMPRESSOR MODEL*	VOLT	MAX kW	HP	COMPRESSOR MOTOR DATA					CIRCUIT BREAKER DATA				
				SEE NOTE 1		SEE NOTE 2		MOTOR WINDING RESISTANCE (Ohms)	SEE NOTE 3	M.H.	M.T.	LRA	SEE NOTE 4
				Maximum Must Trip Amps	Maximum RLA	LRA-XL	LRA-PW (first winding)		Recommended Circuit Breaker Part No.				Recommended RLA
06ER(1/4)50000	208/230	22.0	15	90	72	283	170	0.44	HH83XB626	78	90	250	64.3
(1/4)50100	575			38	31	98	59	2.8	XA460	29	33.5	97	23.9
(1/4)50600	460			46	36	142	85	1.8	XA463	40	46	150	33.9
(1/4)50300	208/230/460			90/46	72/36	283/142	170/85	0.44/0.22	XB626/XA463	78/40	90/46	250/150	64.3/33.9
06ER(1/4)66000	208/230	25.3	20	108	87	345	207	0.32	HH83XB625	91	104	350	74.3
(1/4)66100	575			45	36	120	72	2.2	XA461	33	38	124	27.1
(1/4)66600 (See Note 5)	460			54	44	173	104	1.3	XA424	42	49	175	35
06ER(1/4)65000	208/230	25.3	20	108	87	345	207	0.32	HH83XB625	91	104	350	74.3
(1/4)65100	575			45	36	120	72	2.2	XA461	33	38	124	27.1
(1/4)65600	460			54	44	173	104	1.3	XA424	42	49	175	35
(1/4)65300	208/230/460			108/54	87/44	345/173	207/104	0.32/0.16	XB625/XA424	91/42	104/49	350/175	74.3/35
06ER(1/4)75000	208/230	25.3	20	108	87	345	207	0.32	HH83XB625	91	104	350	74.3
(1/4)75100	575			45	36	120	72	2.2	XA461	33	38	124	27.1
(1/4)75600	460			54	44	173	104	1.3	XA424	42	49	175	35
(1/4)75300	208/230/460			108/54	87/44	345/173	207/104	0.32/0.16	XB625/XA424	91/42	104/49	350/175	74.3/35
06ER(0/3)99000	208/230	39.1	30	168	135	506	304	0.22	HH83XC539	142	163	507	116.4
(0/3)99100	575			65	52	176	106	1.3	XA430	50	58	168	41.4
(0/3)99600	460			84	68	253	152	0.88	XA478	65	76	274	54.3
(0/3)99300	208/230/460			168/84	135/68	506/253	304/152	0.22/0.11	XC539/XA478	142/67	163/76	507/274	116.4/54.3

* The last two digits of the compressor model number may vary. See page 4. The fifth digit in ( ) of the compressor model number represents models with or without oil. 0, 1, 2 signifies older models with oil; 3, 4, 5 signifies newer models without oil. See page 4.

LEGEND:
LRA - Locked Rotor Amps
M.H. - Must Hold Amps
M.T. - Must-Trip Amps
PW - Part-Winding (Start)
RLA - Rated Load Amps
XL - Across-the-Line (Start)

NOTES:
1. Compressor must-trip (M.T.) amps and RLA values are maximum figures.
2. LRA values for PW second winding = 1/2 the LRA -XL value.
3. 3-Pole XL circuit breakers shown, other 3-Pole XL alternates and 6-Pole PW breakers available. Terminal lugs for circuit breakers available in package 06EA660152.
4. Recommended RLA value shown is determined by: circuit breaker must trip value ÷ 1.40. Use this recommended (and minimum) RLA value to determine name plate stamping, minimum contactor sizing, and wire sizing. RECOMMENDED RLA FOR 06E COMPRESSORS EQUALS: MUST- TRIP (M.T.) OF CARLYLE APPROVED OVERCURRENT DEVICE BEING USED ÷ 1.40.
5. 06ER166 New OEM Models no longer produced, replaced by 06ER165.
6. Compressor operating amps at any specific condition can only be determined from a performance curve.
7. Ohm values for resistance are approximate and shown for reference purposes only. Motors from different vendors and motors of different efficiencies can differ up to 15% from data shown.

ALLOWABLE OPERATING RANGE

NOMINAL VOLTAGE	MAXIMUM	MINIMUM
208/230	254	187
460	529	414
575	661	518
400 (50 Hz)	460	342
200 (50 Hz)	230	180

4.5 — 06EM, EZ 3 Phase Electrical Specifications

COMPRESSOR MODEL*	VOLT	MAX kW	HP	COMPRESSOR MOTOR DATA					CIRCUIT BREAKER DATA				
				SEE NOTE 1		SEE NOTE 2		MOTOR WINDING RESISTANCE (Ohms)	SEE NOTE 3	M.H.	M.T.	LRA	SEE NOTE 4
				Maximum Must Trip Amps	Maximum RLA	LRA-XL	LRA-PW (first winding)		Recommended Circuit Breaker Part No.				Recommended RLA
06EM(1/4)50000	208/230	22.0	15	90	72	283	170	0.44	HH83XB626	78	90	250	64.3
(1/4)50100	575			38	31	98	59	2.8	XA460	29	33.5	97	23.9
(1/4)50600	460			46	36	142	85	1.8	XA463	40	46	150	33.9
(1/4)50300	208/230/460			90/46	72/36	283/142	170/85	0.44/0.22	XB626/XA463	78/40	90/46	250/150	64.3/33.9
06EM(2/5)66000	208/230	33.6	25	140	112	446	268	0.27	HH83XC509	110	127	420	90.7
(2/5)66100	575			57	46	164	98	1.6	XA469	46	53	164	37.9
(2/5)66600	460			70	56	223	134	1.1	XA426	55	64	210	45.7
(See Note 5)													
06EM(1/4)75000	208/230	33.6	25	140	112	446	268	0.17	HH83XC509	110	127	420	90.7
(1/4)75100	575			57	46	164	98	1.6	XA469	46	53	164	37.9
1/4)75600	460			70	56	223	134	1.1	XA426	55	64	210	45.7
(1/4)75300	208/230/460			140/70	112/56	446/223	268/134	0.27/0.14	XC509/XA426	110/55	127/64	420/210	90.7/45.7
06EM(1/4)99000	208/230	47.6	35	193	155	610	366	0.18	HH83XC532	158	182	590	130
(1/4)99100	575			77	62	212	127	1.1	XA453	68	78	236	55.7
(1/4)99600	460			96	77	305	183	0.71	XA547	77	88	283	62.9
(1/4)99300	208/230/460			193/96	155/77	610/305	366/183	0.18/0.09	XC532/XA547	158/77	182/88	590/283	130/62.9

* The last two digits of the compressor model number may vary. See page 4. The fifth digit in ( ) of the compressor model number represents models with or without oil. 0, 1, 2 signifies older models with oil; 3, 4, 5 signifies newer models without oil. See page 4.

LEGEND:
LRA - Locked Rotor Amps
M.H. - Must Hold Amps
M.T. - Must-Trip Amps
PW - Part-Winding (Start)
RLA - Rated Load Amps
XL - Across-the-Line (Start)

NOTES:
1. Compressor must-trip (M.T.) amps and RLA values are maximum figures.
2. LRA values for PW second winding = 1/2 the LRA -XL value.
3. 3-Pole XL circuit breakers shown, other 3-Pole XL alternates and 6-Pole PW breakers available. Terminal lugs for circuit breakers available in package 06EA660152.
4. Recommended RLA value shown is determined by: circuit breaker must trip value ÷ 1.40. Use this recommended (and minimum) RLA value to determine name plate stamping, minimum contactor sizing, and wire sizing. RECOMMENDED RLA FOR 06E COMPRESSORS EQUALS: MUST-TRIP (M.T.) OF CARLYLE APPROVED OVERCURRENT DEVICE BEING USED ÷ 1.40.
5. 06EM266 New OEM Models no longer produced, replaced by 06EA265.
6. Compressor operating amps at any specific condition can only be determined from a performance curve.
7. Ohm values for resistance are approximate and shown for reference purposes only. Motors from different vendors and motors of different efficiencies can differ up to 15% from data shown.

ALLOWABLE OPERATING RANGE

NOMINAL VOLTAGE	MAXIMUM	MINIMUM
208/230	254	187
460	529	414
575	661	518
400 (50 Hz)	460	342
200 (50 Hz)	230	180

4.6 — 06EA, ET 3 Phase Electrical Specifications

COMPRESSOR MOTOR DATA									CIRCUIT BREAKER DATA				
COMPRESSOR MODEL*	VOLT	MAX kW	HP	SEE NOTE 1		SEE NOTE 2		MOTOR WINDING RESISTANCE (Ohms)	SEE NOTE 3	M.H.	M.T.	LRA	SEE NOTE 4
				Maximum Must Trip Amps	Maximum RLA	LRA-XL	LRA-PW (first winding)		Recommended Circuit Breaker Part No.				Recommended RLA
06EA(2/5)50000	208/230	25.3	20	108	87	345	207	0.32	HH83XB625	91	104	350	74.3
(2/5)50100	575			45	36	120	72	2.2	XA461	33	38	124	27.1
(2/5)50600	460			54	44	173	104	1.3	XA424	42	49	175	35
(2/5)50300	208/230/460			108/54	87/44	345/173	207/104	0.32/0.16	XB625/XA424	91/42	104/49	350/175	74.3/35
06EA(2/5)65000	208/230	33.6	25	140	112	446	268	0.27	HH83XC509	110	127	420	90.7
(2/5)65100	575			57	46	164	98	1.6	XA469	46	53	164	37.9
(2/5)65600	460			70	56	223	134	1.1	XA426	55	64	210	45.7
(2/5)65300	208/230/460			140/70	112/56	446/223	268/134	0.27/0.14	XC509/XA426	110/55	127/64	420/210	90.7/45.7
06EA(2/5)75000	208/230	39.1	30	168	135	506	304	0.22	HH83XC539	142	163	507	116.4
(2/5)75100	575			65	52	176	106	1.3	XA430	50	58	168	41.4
(2/5)75600	460			84	68	253	152	0.9	XA478	65	76	274	54.3
(2/5)75300	208/230/460			168/84	135/68	506/253	304/152	0.22/0.11	XC539/XA478	142/67	163/76	507/274	116.4/54.3
06EA(2/5)99000	208/230	54.0	40	236	189	690	414	0.15	HH83XC537	187	215	636	153.6
(2/5)99100	575			94	75	276	165	1	XA551	74	85	236	60.7
(2/5)99600	460			118	95	345	207	0.58	XA550	92	106	295	75.7
(2/5)99300	208/230/460			236/118	189/95	690/345	414/207	0.15/0.07	XC537/XA550	187/92	215/106	636/295	153.6/75.7

* The last two digits of the compressor model number may vary. See page 4. The fifth digit in ( ) of the compressor model number represents models with or without oil. 0, 1, 2 signifies older models with oil; 3, 4, 5 signifies newer models without oil. See page 4.

LEGEND:
LRA - Locked Rotor Amps
M.H. - Must Hold Amps
M.T. - Must-Trip Amps
PW - Part-Winding (Start)
RLA - Rated Load Amps
XL - Across-the-Line (Start)

NOTES:
1. Compressor must-trip (M.T.) amps and RLA values are maximum figures.
2. LRA values for PW second winding = 1/2 the LRA -XL value.
3. 3-Pole XL circuit breakers shown, other 3-Pole XL alternates and 6-Pole PW breakers available. Terminal lugs for circuit breakers available in package 06EA660152.
4. Recommended RLA value shown is determined by: circuit breaker must trip value ÷ 1.40. Use this recommended (and minimum) RLA value to determine name plate stamping, minimum contactor sizing, and wire sizing. RECOMMENDED RLA FOR 06E COMPRESSORS EQUALS: MUST-TRIP (M.T.) OF CARLYLE APPROVED OVERCURRENT DEVICE BEING USED ÷ 1.40
5. Compressor operating amps at any specific condition can only be determined from a performance curve.
6. Ohm values for resistance are approximate and shown for reference purposes only. Motors from different vendors and motors of different efficiencies can differ up to 15% from data shown.

ALLOWABLE OPERATING RANGES

NOMINAL VOLTAGE	MAXIMUM	MINIMUM
208/230	254	187
460	529	414
575	661	518
400 (50 Hz)	460	342
200 (50 Hz)	230	180

4.7 — 06CC (16 to 37 Cfm) 3 Phase Electrical Specifications

COMPRESSOR MODEL	MAX kW	HP	COMPRESSOR MOTOR DATA						
			ELECTRICAL DATA					OVERLOAD CARLYLE PART NO.	PART NO. T.I. NO.
			VOLTS	MCC	RLA	LRA	MOTOR WINDING RESISTANCE (Ohms)		
06CC016J101	6.25	5	575	10.8	6.9	40	3.3	HN69GZ032	8347A23-42
D101			208/230	27	17.3	100	0.54	HN69GZ024	8347A23-63
G101			460	13.5	8.7	50	2.1	HN69GZ014	8347A23-53
06CC018J101	6.25	5	575	10.8	6.9	40	3.3	HN69GZ032	8347A23-42
D101			208/230	27	17.3	100	0.54	HN69GZ024	8347A23-63
G101			460	13.5	8.7	50	2.1	HN69GZ014	8347A23-53
06CC124J101	9.18	6.5	575	13.2	8.5	64	2.6	HN69GZ037	8347A23-40
D101			208/230	33	21.2	160	0.42	HN69GZ214	8348A23-9
G101			460	16.5	10.6	80	1.7	HN69GZ038	8347A23-18
06CC125J101	9.18	6.5	575	13.2	8.5	64	2.6	HN69GZ037	8347A23-40
D101			208/230	33	21.2	160	0.42	HN69GZ214	8348A23-9
G101			460	16.5	10.6	80	1.7	HN69GZ038	8347A23-18
06CC228J101	12.8	7.5	575	16.7	10.2	79	2.0	HN69GZ004	8347A23-19
D101			208/230	41.6	26.7	198	0.31	HN69GZ306	8347B23-13
G101			460	20.9	13.4	99	1.3	HN69GZ010	8347A23-29
06CC337J101	16.5	10	575	18.8	12.1	91	1.7	HN69GZ025	8347A23-31
D101			208/230	46.5	29.8	228	0.26	HN69GZ309	8347B23-11
G101			460	23.3	14.9	114	1.0	HN69GZ024	8347A23-63

LEGEND
LRA - Locked Rotor Amps
MCC - Maxmium Continuous Current
RLA - Rated Load Amps

NOTES:
1. RLA (rated load amps) value shown for new high efficiency models is MCC ÷ 1.56 = RLA. Use this recommended (and minimum) RLA value to determine nameplate stamping. Minimum contactor sizing and wire sizing.
2. Compressor operating amps at any specific conditions can only be determined from a performance curve.
3. RLA values for 06D compressor protected by a calibrated circuit breaker will depend on must-trip value of circuit breaker.
4. Ohm values shown for resistance are approximate and shown for reference only. Motors from different vendors and motors of different efficiencies can differ up to 15% from data shown.

ALLOWABLE OPERATING RANGES

NOMINAL VOLTAGE	MAXIMUM	MINIMUM
208/230	254	187
460	529	414
575	661	518
400 (50 Hz)	460	342
200 (50 Hz)	230	180

4.8 – 06CC (50 to 99 Cfm) 3 Phase Electrical Specifications

COMPRESSOR MODEL	VOLT	MAX kW	HP	SEE NOTE 1	SEE NOTE 2		MOTOR WINDING RESISTANCE (Ohms)	SEE NOTE 3	M.H.	M.T.	LRA	SEE NOTE 4
				Maximum Must Trip Amps	LRA-XL	LRA-PW (First Winding)		Recommended Circuit Breaker Part No.				Recommended RLA
06CC550F201	460	22.0	15	32	142	85	2.8	HH83XB414	27	32	145	23
550J201	575			27	98	59	1.8	XB438	23	27	86	19
550E201	208/230/460			68/32	283	170	0.44/0.22	XB455/XB414	59	68	245	49
06CC665F201	460	25.3	20	50	173	104	2.2	HH83XB437	43	50	176	36
665J201	575			38	120	72	1.3	XA461	33	38	124	27
665E201	208/230/460			100/50	345/173	207	0.32/0.16	XB376/XB437	73	85	333	61
06CC675F201	460	25.3	20	50	173	104	2.2	HH83XB437	43	50	176	36
675J201	575			38	120	72	1.3	XA461	33	38	124	27
675E201	208/230/460			100/50	345/173	207	0.32/0.16	XB378/XB437	77	89	365	64
06CC899F201	460	39.1	30	58	253	152	1.3	HH83XB432	63	73	240	52
899J201	575			58	176	106	0.88	XA430	50	58	168	41
899E201	208/230/460			141/73	506/253	304	0.22/0.11	XC406/XB432	122	141	464	101

LEGEND:
LRA - Locked Rotor Amps
MCC-Maximum Continuous Current
RLA-Rated Load Amps

NOTES:
1. Compressor must-trip (M.T.) amps and RLA values are maximum figures.
2. LRA values for PW second winding = 1/2 the LRA -XL value.
3. 3-Pole XL circuit breakers shown, other 3-Pole XL alternates and 6-Pole PW breakers available. Terminal lugs for circuit breakers available in package 06EA660152.
4. Recommended RLA value shown is determined by: circuit breaker must trip value ÷ 1.40. Use this recommended (and minimum) RLA value to determine name plate stamping, minimum contactor sizing, and wire sizing. RECOMMENDED RLA FOR 06CC COMPRESSORS EQUALS: MUST-TRIP (M.T.) OF CARLYLE APPROVED OVERCURRENT DEVICE BEING USED ÷ 1.40.
5. Compressor operating amps at any specific condition can only be determined from a performance curve.
6. Ohm values for resistance are approximate and shown for reference purposes only. Motors from different vendors and motors of different efficiencies can differ up to 15% from data shown.

ALLOWABLE OPERATING RANGES

NOMINAL VOLTAGE	MAXIMUM	MINIMUM
208/230	254	187
460	529	414
575	661	518
400 (50 Hz)	460	342
200 (50 Hz)	230	180

4.9 — 06D Compressor Overloads*

(see 4.7, pg 104 for 06CC (16-37 cfm) overloads)

COMPRESSOR SIZE	VOLTAGE†	CARLYLE NO.	T.I. NO.	REMARKS
06DR109	208/230-1-60	HN69GZ025 HN69GZ032	8347A23-31 8347A23-42	Common start
06DM808 06DR013	208/230-1-60	HN69GZ024 HN69GZ014	8347A23-63 8347A23-53	Common start
06DM313 06DM316 06DR316 06DR718	208/230-1-60	HN69GZ106 HN69GZ037	8348A7-4 8347A23-40	Common start
06DR109	208/230	HN69GZ007	8347A23-54	2 Required
	460	HN69GZ015	8347A23-92	2 Required
	575	HN69GZ011	8347A23-86	2 Required
06DM808	208/230	HN69GZ053	8347A23-19	2 Required
06DR013	460	HN69GZ012	8347A23-56	2 Required
	575	HN69GZ012	8347A23-56	2 Required
06DM313 06DM316 06DR316 06DR718	208/230	HN69GZ024	8347A23-63	2 Required
	460	HN69GZ014	8347A23-53	2 Required
	575	HN69GZ032	8347A23-42	2 Required
06DA818	208/230	HN69GZ214	8348A17-9	2 Required
06DR820	460	HN69GZ038	8347A23-18	2 Required
06DR724 (25)	575	HN69GZ037	8347A23-40	2 Required
06DA824 (25)	208/230	HN69GZ306	8348B19-13	2 Required
06DR228	460	HN69GZ010	8347A23-29	2 Required
	575	HN69GZ053	8347A23-19	2 Required
06DA328	208/230	HN69GZ309	8348B19-11	3 Required
06DM337	460	HN69GZ024	8347A23-63	2 Required
06DR337	575	HN69GZ025	8347A23-31	2 Required
06DA537 06DR541	208/230	HN69GZ214	8348A17-9	4 Required **
	460	HN69GZ106 or HN69GZ307	8348A7-4 or 8348A19-4	2 Required
	575	HN69GZ301	8347A30-69	2 Required

* Based on new high efficiency (H.E.) extended voltage compressor models.

† Voltage is 3 Phase 60 cycle, unless noted as single-phase 60 cycle.

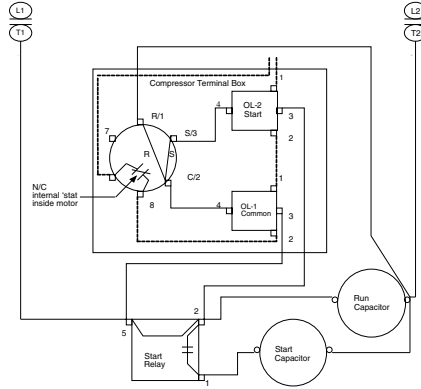
** Two overloads in parallel in legs 1 and 3.

NOTE: Most 06D compressors have internal thermostat installed in motor and wire across terminals 8 and 9 at the terminal block. It trips (opens) control circuit at 221°F (105°C) and resets at 181°F (83°C)

4.10 — Electrical Hook-Up

Consult wiring diagram located inside compressor terminal box cover and reference diagrams shown below for wiring hook-up connection locations. See 3.31, pg 88 for Terminal Box Packages.

06D Single Phase

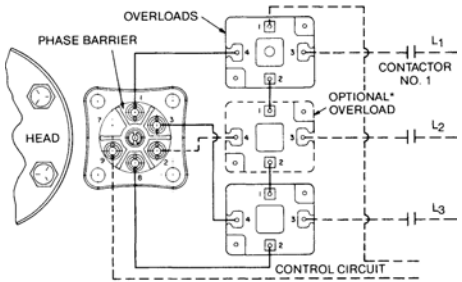


06D Single Phase Wiring

Control Wiring — Power Wiring

SINGLE PHASE INTERNAL THERMOSTAT

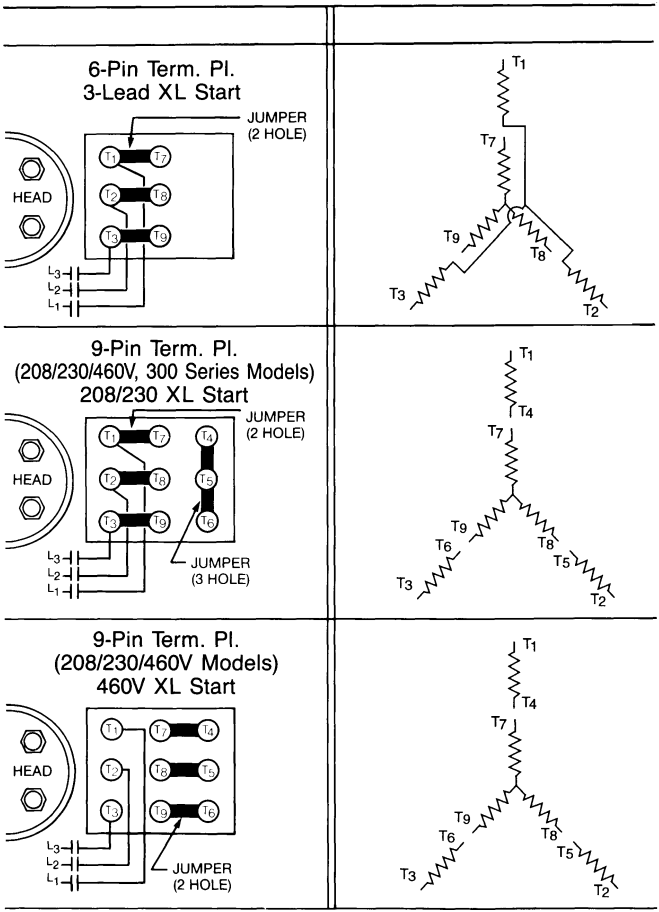
06D Three Phase



* 3rd overload required on some compressors. See 4.9 06D compressor overloads.

Three Phase Across-the-Line Start Internal Thermostat

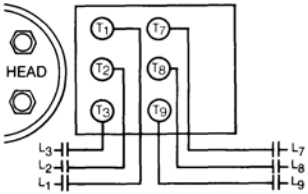
06E COMPRESSORS
(ACROSS-THE-LINE [XL] START)

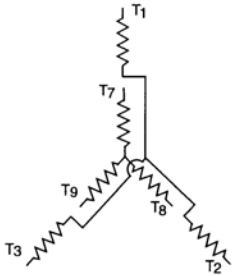


See Fig.17, page 111, for detailed view of terminal post arrangement.

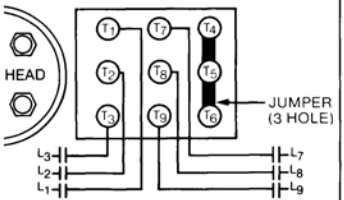
06E COMPRESSORS
(PART WINDING START)

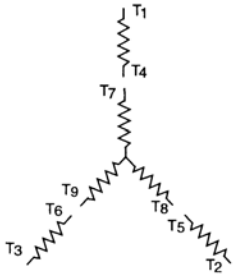
6-Pin Term. Pl.
6-Lead PW Start





9-Pin Term. Pl.
(208/230/460V, 300 Series Models)
208/230 PW Start Only





9-Pin Term. Pl.
(460V, 600 Series Models)
460 PW Start

WARNING

With 208/230/460V 300 Series Models, the 460V cannot be wired for PW start. Use distinct 460V 600 Series Models for any 460V PW application.

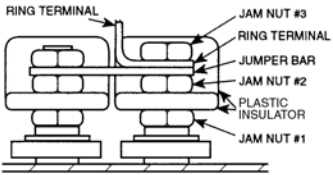


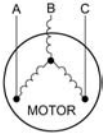
Fig. 17 – Terminal Post Arrangement, Detail View (06E and 06CC 50 to 99 Cfm)
See page 61 for torques of jam nuts

4.11 — Voltage and Current Unbalance

VOLTAGE UNBALANCE (Maximum 2%)

Voltage unbalance can cause motors to overheat and fail. Below is the recommended method for determining voltage unbalance.

Example: Supply voltage is 240-3-60



AB = 243 volts
BC = 236 volts
AC = 238 volts

$$\text{Average Voltage} = \frac{243 + 236 + 238}{3}$$

$$= \frac{717}{3}$$

$$= 239 \text{ volts}$$

Determine maximum deviation from average voltage:
(AB) 243 – 239 = 4 volts
(BC) 239 – 236 = 3 volts
(AC) 239 – 238 = 1 volt

Maximum deviation is 4 volts.
Determine % voltage unbalance:

$$\% \text{ Voltage unbalance} = 100 \times \frac{4}{239}$$

$$= 1.7\%$$

This amount of phase unbalance is satisfactory as it is below the maximum allowable of 2%.

IMPORTANT: If the supply voltage phase unbalance is more than 2%, contact your local electric utility company immediately.

CURRENT UNBALANCE (Maximum 10%)

Voltage unbalance will cause a current unbalance, but a current unbalance does not necessarily mean that a voltage unbalance exists. A loose terminal connection or a build-up of dirt or carbon on one set of contacts (using the example of L1 as the problem leg) would cause a higher resistance on that leg (L1) than on L2 and L3. The current follows the path of least resistance, so the current increases in legs L2 and L3. Higher current causes more heat to be generated in the motor windings.

Percent (%) of current unbalance is calculated in the same way as voltage unbalance (see the previous section), with a maximum acceptable current unbalance of 10%.

5.0 COMPRESSOR SERVICE WORKSHEETS

Carlyle recommends that the Compressor Service Worksheets (pages 114 and 115) be copied (and enlarged, if preferred) and filled out for each compressor at initial start-up and each time the compressor is serviced. Comparing the data from current worksheets to past records will allow the service technician to diagnose system changes and prevent compressor failures. This information is also very useful in preventing a repeat failure.

06D, 06E Compressor Service Worksheet

Mechanic:_____ Date: _____

From Compressor Nameplate:

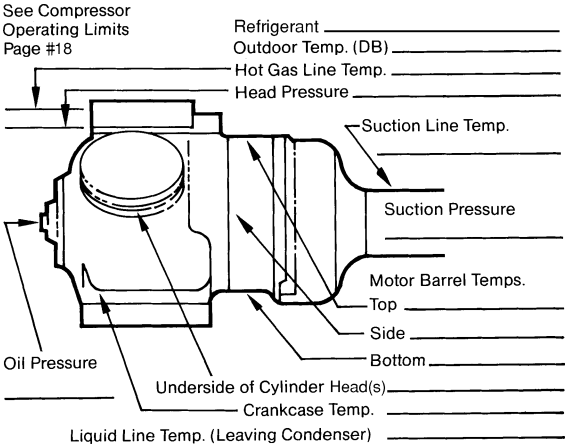
Model No.: _____

Serial No.: _____

Motor No.: _____

Voltage: _____

Allow compressor to run for 30 minutes, then obtain the pressures and body temperature at the locations shown below. Check for proper oil return in sight glass.



COMPRESSOR VOLTAGE/AMP VALUES			
PH	**VOLTAGE**	**CURRENT**	
1φ	**C-R:**_____	**C:**_____	
	C-S:_____	**R:**_____	
	R-S:_____	**S:**_____	
3φ	L_1-L_2:_____	L_1:_____	
	L_1-L_3:_____	L_2:_____	
	L_2-L_3:_____	L_3:_____	
		PART WINDING	
	L_7-L_8:_____	L_7:_____	
	L_7-L_9:_____	L_8:_____	
	L_8-L_9:_____	L_9:_____	

Make copies of this worksheet to record data at initial start-up and whenever the compressor is serviced.

LEGEND: C - Common R - Run S - Start

06CC Compressor Service Worksheet

Mechanic:_____ Date: _____

From Compressor Nameplate:

Model No.: _____

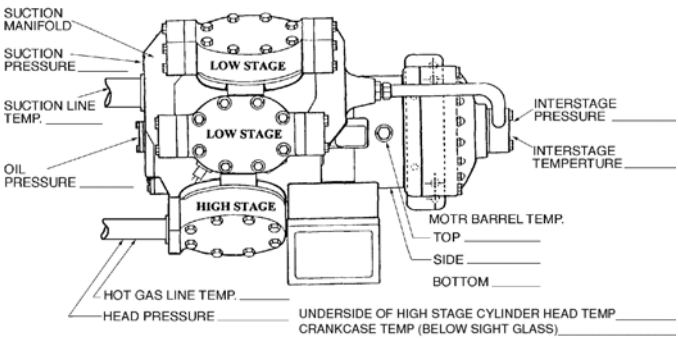
Serial No.: _____

Motor No.: _____

Voltage: _____

Allow compressor to run for 30 minutes, then obtain the pressures and body temperature at the locations shown below. Check for proper oil return in sight glass.

See Compressor Operating Limits, page 19.



COMPRESSOR VOLTAGE/AMP VALUES		
PH	**VOLTAGE**	**CURRENT**
1φ	**C-R:**_____	**C:**_____
	C-S:_____	**R:**_____
	R-S:_____	**S:**_____
3φ	L_1-L_2:_____	L_1:_____
	L_1-L_3:_____	L_2:_____
	L_2-L_3:_____	L_3:_____
		PART WINDING
	L_7-L_8:_____	L_7:_____
	L_7-L_9:_____	L_8:_____
	L_8-L_9:_____	L_9:_____

Make copies of this worksheet to record data at initial start-up and whenever the compressor is serviced.

LEGEND: C - Common R - Run S - Start

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